

***United States Court of Appeals
for the Second Circuit***



APPENDIX

75-7621
75-7645

No. 75-7621

No. 75-7645

IN THE
United States Court of Appeals
FOR THE SECOND CIRCUIT

PLANTRONICS, INC.,

*Plaintiff-Appellant
and Cross-Appellee,*

v.

ROANWELL CORPORATION,

*Defendant-Appellee
and Cross-Appellant,*

APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

JOINT APPENDIX VOL. II (PAGES 567-1129)

TOM ARNOLD
PAUL M. JANICKE
ARNOLD, WHITE AND DURKEE

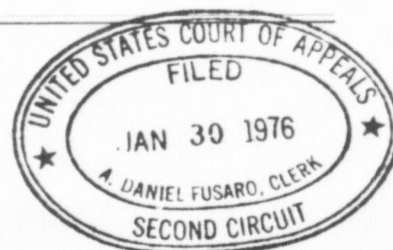
2100 Transco Tower
Houston, Texas 77027
(713) 621-9100

Attorneys for Plantronics

Of Counsel:

ROBERT NEUNER
BRUMBAUGH, GRAVES, DONOHUE AND RAYMOND

30 Rockefeller Plaza
New York, New York 10020
(212) 489-3300



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APPENDIX

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MR. ARNOLD: Your Honor, I have been reminded at the recess that though I offered Exhibits 143 and 144, I didn't get a ruling. Mr. Bradley has stipulated they may be received in evidence.

THE COURT: All right, they are received.

(Plaintiff's Exhibits 143 and 144 were received in evidence.)

Q I address your attention to the units sent to Bell Laboratories, particularly the unit Plaintiff's Exhibit 144, which is the Model 70.

Does that model 70 have a hook for the ear comparable to the current model 70, the physical specimen of which is Plaintiff's Exhibit 4, and I am speaking of this little part which I suppose we can call -- what? What do you call that part?

A A hook.

Q Well, all right, that is too generic for me. But we will call it "this hook."

The unit that you delivered to Bell did not have "this hook," did it?

A That is correct.

Q By contrast the Hutchings did have "this hook," is that correct?

A Yes, I think it did.

1 Q All of the drawings that we have seen up until
2
3 this time indicated that as regards the over-the-ear model
4 that we didn't have an opportunity to make a proper swivel,
5 correct?

6 A Repeat that again, please.

7 Q That on the over-the-ear approach there was a
8 difficulty or some problem in how you could make the mouth
9 tube swivel? We read that on these several drawings that
10 we just got through with a few minutes ago.

11 A Yes.

12 Q Now I address your attention, then, to Page 40
13 of Exhibit 140, the yellow book, and I find "Construction
14 of voice tube socket assembly PPI unit."

15 What is that drawing and why was it made?

16 A That is the swivel that attaches the voice tube
17 to the basic housing..

18 Q And that is a drawing made by Roanwell of the
19 Plantronics unit which by now you had gotten a specimen of,
20 is that not correct?

21 A Yes.

22 Q I address your attention, then, to the next page,
23 Page 47 of Exhibit 140 entitled "Construction of voice
24 tube socket assembly PPI unit," and I ask you why that
25 drawing was made?

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1 A I guess it was a record of what we found as to
2 how the PPI unit was made.

3 Q Why would you have been interested in the
4 dimensions down to the details which are revealed on that
5 particular drawing?
6

7 A I would guess it to be as a comparison to the
8 dimensions that we had and seeing how we could utilize that
9 concept of putting it on our headset.

10 Q All right. I address your attention, then,
11 to Page 48. I believe you testified on deposition that
12 this drawing reflected measurements down to the last thousand
13 of an inch of the PPI unit. Is that not correct?

14 A I don't remember my deposition, but it is
15 roughly correct, yes.

16 Q All right. Then Page 43, a drawing of May 27,
17 1970, which shows the housing for an over-the-ear unit
18 without the prong. Let's call what we were talking about
19 as "this hook," because I am afraid that is too generic and
20 will be misunderstood, let's call it the prong on the top
21 of the ear. Is that a fair name for this part?

22 A Just so we both understand what it means.

23 Q There is no prong shown on the drawing of May
24 27, 1970, which is Page 43 of the exhibit, correct?

25 A That is correct.

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2 Q And that is the version of the housing that
3 was utilized in the submission to the Bell System?

4 A I think so.

5 Q That same drawing shows obsoleted 6/3/70, just
6 six days later, apparently, correct?

7 A Six days later than what, sir?

8 End 5A

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2 Q Than if date the drawing was apparently made on May
3 27, 1970, or maybe seven days later?

4 A It is all right. Yes, sir.

5 Q Now address your attention to page 41. That is
6 another drawing of the Plantronics unit and I notice that
7 that drawing of the Plantronics unit is dated the same day as
8 page 43, which did not have this prong on the upper hook,
9 and then we go from there to page 45, another drawing of
10 the same date, May 27, 1970, and what do we have there?

11 A Would you state that again? We have a drawing
12 there which reflects a PPI and a Roanwell headset with
13 a hook indicated.

14 Q That shows the two units overlaid and special
15 attention drawn 1/8 thick blended into existing housing
16 and that arrow is pointed to this thing we are calling
17 the prong, is that not correct?

18 A Yes.

19 Q Then we have on page 39 a comparison of PPI's
20 StarSet and the R-70-A with several of the same dimensions.
21 On page 42 we have another overlay, and what is overlaid
22 in this instance?

23 A May I read page 39 for a minute?

24 Q Excuse me. I didn't hear you.

25 A May I read page 39? You referred me to it.

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2 Give me a chance to read it.

3 (Pause.)

4 A Okay. And after 39 was page what, sir?

5 Q 42. I understand we are proceeding essentially
6 in date order although I see this one is dated 6/1/70.

7 Here we have an overlay. What is that an overlay of?

8 A Well, it is an overlay of the design as we had
9 it of the R-71-A and the R-70 and the PPI StarSet.

10 Q What would be the purpose of an overlay of that
11 type at this stage? We are now into June of 1970, which is
12 six months after your submission to Bell.

13 Had you gotten criticisms on your unit from Pell
14 by this time?

15 A We had received comments. I don't know whether you
16 could classify them as criticisms. We had received comments,
17 yes.

18 Q In response to those comments or at least after
19 receiving those comments -- I will avoid the argumentative
20 word -- after receiving those comments you went back
21 and did an overlay of both of your units on top of
22 the Plantronics unit, did you not?

23 A I am not sure one was tied into the other in terms
24 of events. In terms of dates, that may be, but I am not
25 sure one event led to the other.

2 Q I accept your recitation. At this point we couldn't
3 say whether they were tied or not tied so will pass it.

4 I address your attention now to page 46, and here
5 we find the first drawing that I have been able to identify
6 dated June 11, 1970, where there is a drawing of a
7 Roanwell 70-A that has this extra prong on the upper ear hook
8 is that not correct?

9 A Yes.

10 Q Now, there is added in this drawing -- there has
11 been reference to it earlier. I don't mean to indicate this
12 was the first time it has come up but this is the first
13 time I remember seeing a drawing -- an item called the
14 smaller hook and an item called the larger hook.

15 Would you explain those to the Court since we have
16 not had those explained heretofore?

17 A The ear hook was a hook that was intended to slide
18 underneath the ear if an operator or a user required
19 excessive or extreme stability. Again we found with our
20 headsets that there was a great variation in operators
21 and comfort level as well as fit of the two headsets. We
22 tried to make the best compromise that we could to fit
23 the maximum number of people comfortably and stably, but
24 we encountered certain cases where people on either unit
25 or both units were not fit to their satisfaction with

1
2 complete stability and most likely these were people like
3 FAA controllers, people who had quite a bit of movement.

4 So we designed an ear hook that slides up and down
5 on a tube on the unit that allowed the operator to position
6 his ear hook underneath the lobe to provide additional
7 stability if that became desired, and the operator could either
8 use it or not use it.
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2 Q So at this stage six months after your submission
3 to Bell Telephone Laboratories, you were still quite con-
4 cerned that as to a substantial number of users, your
5 over-the-ear unit would not have adequate stability for the
6 voice tube but that you would give them something else
7 to hold on underneath and lend extra stability to the whole
8 thing?

9 A Gee, the way you put it sounds like an exaggeration
10 but quite concerned. I have been gone from Roanwell for two
11 years. I would guess at this very moment they are still
12 working on seeing the limited number of people that either
13 cannot be comfortably fitted to try to get them a headset
14 that does fit.

15 I think there is a continuing design process that
16 goes on that improves the product to optimize its capabilities.

17 Q I direct your attention to page 44 where there
18 are written notes that are in line with what you have
19 just discussed. The paragraph numbered 1, "Ear Hook.
20 Adjustable needed to provide stability and fit on female
21 and small male ears."

22 Apparently there was a special focus on the
23 smaller ear and the ear hook had the focus of attention there.

24 Paragraph 2, "Variations needed in size of ear hooks
25 to fit large male ears."

2 That wasn't the point I was looking for. The one
3 that I was looking for was down here under B. "Longer hook
4 fits approximately 70 per cent of male and all female
5 ears."

6 Do you know where you got that information
7 that with the longer hook you would fit that percentage
8 of the potential wearers of the unit?

9 A I think what we did is we went around our plant
10 and took a rough survey in terms of ear size and we
11 realized that the variation in ear size was very large
12 and that the sliding of one hook could not accomplish the
13 total range of adjustments so we had some sort of a curve,
14 a distribution that we had observed in our plants, which
15 had 200 some people.

16 Q The next notation that seems to me to be significant
17 is the one under paragraph C, which says, "We will supply
18 both size ear hooks with instructions for usages."

19 And now I focus, "for males with large ear hook off--"
20 excuse me, I didn't read it correctly. "For males, which
21 large ear hook fails to fit, recommended no ear hook be
22 used."

23 Has that continued to be the practice that you
24 recommend no ear hook be used when it doesn't seem to fit?

25 A Well, I don't know to this very day but the thing

2 that we did find by and large is that the larger ears
3 had less of a problem with comfortable fit than the smaller
4 ears and by and large the large ears did not have a real
5 need for an ear hook.

6 Q Finally, on this page I would focus at the next
7 recitation because I have been unable to find any
8 comparable recitation about the under-the-ear model. But
9 maybe there is one. It says in 3, "Small fixed hook over
10 the ear needed,"and I think that that is obviously this
11 prong we have been talking about that was not on your
12 first unit but was subsequently added.

13 "Small fixed hook over the ear needed for stability
14 when under-the-ear hook is not used and for locating
15 mike boom. Location critical on small female ears.

16 That suggests, does it not, that you were still
17 hyperconcerned about the location on small female ears of
18 the microphone boom until you added at least this extra
19 prong, is that not a fair construction of that recitation?

20 A Would you define hyperconcern for me?

21 Q I accept your suggestion. Give us your
22 adjectives instead of mine.

23 A I think we were concerned trying to fit the
24 maximum number of people we could and the most difficult-
25 fitting were small female ears.

2 We were concerned and I am sure to this day are
3 concerned.

4 Q Page 35 we find the recitation in a memorandum
5 from you to Mr. -- I sav from you, that's in error. I
6 believe it is to you.

7 A That is correct.

8 Q From whom?

9 A Gee, I don't know. Let me take a look. Mr.
10 Clark.

11 Q Mr. Clark, again, was which position in the company
12 at that time?

13 A He was marketing manager.

14 Q He says in paragraph 1 that there is no particular
15 merit in making the over-the-ear portion of the molded
16 case thinner than PPI.

17 Do you know whether or not that idea had been con-
18 sidered, to try to make it thinner than the PPI unit?

19 A May I read the whole paragraph first?

20 Q Surely.

21 A Okay. Would you ask the question?

22 Q Well, first let's go back and identify Mr.
23 Clark. You indicated he was in marketing but he
24 was also an engineering graduate, was he not?

25 A Yes, to the best I know, he was.

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Q And he recites in the first part of paragraph 1 that there is no particular merit in making the over-the-ear portion of the molded case thinner than PPI.

My question is, had that been considered that you would try to make the over-the-ear portion thinner than the PPI unit?

A I don't recall any conversations to that effect. From his writing I would assume it was discussed. I personally don't recall whether we recommended it or considered it or were even able to do so.

Q Let's try the next sentence. It has in it, after a lead-in, "It might be desirable to make the two (PPI and Roanwell) boom assemblies interchangeable.

Can you suggest to me any reason why that would be desirable?

A Sure. I think any customer that has one set, when he considers buying another set would love to have a maximum amount of interchangeable parts if he possibly could do so.

Q The next sentence then reads, "However, before this could be 'exploited' a comparison of the performance would be required."

What do you have in mind as to how you would exploit this interchangeability of parts?

1 A I think what he was saying, there is an engineer
2 who indicated that he realized that the interchangeability
3 of the speech tube affected many other performance require-
4 ments and that before he would want to make a recommendation
5 that we make the two speech tubes interchangeable, he would
6 like to know what the effect on performance is.
7

8 THE COURT: Well, he is asking about the meaning
9 of the word exploited.

10 THE WITNESS: Well, sir, I might point out that
11 Mr. Clark was British and he tended to use words on occa-
12 sions that I found rather strange. I think I know what
13 the word exploitation means but I am not an English major.
14

15 THE COURT: I assume what he means is that you
16 would use the interchangeability of the boom assemblies as
17 a sales feature?

18 THE WITNESS: That is, I think, a reasonable
19 assumption.

20 Q Finally in connection with this letter, I direct
21 your attention to page 36 of the exhibit which is
22 the second page of the letter, and to the recitation which
23 reads about six lines down from the top, "If users elect
24 not to employ the hook, ie, users may prefer to forego the
25 extra stability which the hook provides if they determine
 it is acceptable for their particular application sans

2 hook."

3 Is it not a fact that a large number of users,
4 a very large number of the users lose or abandoned these --
5 they are speaking of the lower hook, are we not, first
6 let's get that clear. Is that reference to the lower hook?

7 A I believe that is correct. Yes.

8 Q Is it not a fact that a large number of the
9 users, either lose or abandon that lower hook and quit
10 using it after a week or two or three or whatever, they
11 find that really on the Model R-70 they can get by very well
12 without that hook?

13 A Well, sir, I personally am not familiar with that.

Q If you are not familiar with it, then we won't

ask about it.

Finally or near finally, Page 33 of the exhibit,

we have a note there from whom. Can you identify who the

author of that is on January 22, 1971?

A I think that is Mr. Potter.

Q And it is to Mr. Powers and the first line is,

I have reviewed briefly the copy of the PPI-Hutchings

patent 3,548,118, which is one of the patents here in suit,

which was sent to us on 1/20/70, by Lester Clark. Attached

are my sketchy notes which we can discuss at your convenience."

Down at the bottom of the page I address your

attention, you would read the whole sentence -- maybe I

should read the whole sentence to get the focus correct.

"Our R70A over-the-ear design has some features

in common with the PPI/Hutchings design, but frankly don't

think we have much to worry about -- since most, "and I am

adding the focus on most, although there was original

focus on most there that was not mine," of the PPI claims

seem to have been predated. However, we should check

this with Les Clark when we shortly proceed to discuss design

patents for our 70A and 71A."

Following that letter, he has a sheet which

indicates things that are possibly new that appear on Page

34. His letter made reference to most things were predated but then he says possibly new.

The first thing that he says is possibly new is behind-the-ear. In terms of hearing aids, to this good date, is it not true that -- well now, maybe I stand corrected because we do know about the Flygstad now and the MS43 now that did not succeed, but in terms of the behind-the-ear units that succeeded, to this good day was not the Hutchings one the first one that ever succeeded in the market place? Was that not a new item at least among the items that succeeded in the market place?

A I would rather not comment about the market place
I don't think I am qualified to do that.

Q I will ask it this way. Do you know of any
behind the ear headsets -- just identify those that you know
about without saying whether they are in the market place
or not.

A I think the ones most familiar are the two Roanwell units, the PPI unit and the Northern Electric unit.

Q That is the one that has the little microphone in front that we have identified as the Venture I?

A Yes.

Q And all of those units are subsequent to Mr. Hutchings' invention?

1 zb-3

Mol-direct

2 A Yes, certainly. I become familiar with them
3 after Mr. Hutchings --

4 Q The next thing he mentions as possibly new is
5 two, method of attaching removable ferrule containing ball
6 and socket to housing. He mentions that that is common
7 in many mechanisms but henevertheless has listed as possibly
8 new this very thing that you had drawn the copy of the
9 Plantronics unit down to the last thousandth of an inch,
10 is that correct?

11 A Yes.

12 Q Then three, over the ear hook. Again I take it
13 he is speaking there of the item we called the prong a few
14 minutes ago?

15 A Correct.

16 Q Counterbalancing torque for stability. What is
17 he addressing his attention to there?

18 A I haven't got the foggiest idea.

19 Q Then I address your attention to the drawing
20 that is Page 50, and at the time of your deposition we had
21 you compare those dimensions with the dimensions on the
22 drawing No. F415, is it, which is page --

23 THE COURT: Page 48.

24 Q 48, and you testified before in all events that
25 the dimensions on the Roanwell unit as reflected on Page 50

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were to the last thousandths of an inch the same as on the Plantronics unit. Do you have any reason to change that testimony?

A I don't recollect the testimony. I haven't seen it in three years, but substantially I think that would be correct, yes.

THE COURT: How about Page 49 which shows the socket. Is that the same to a thousandth of an inch as the drawing of the PPI socket on Page 48?

THE WITNESS: I don't know if it was a thousandth of an inch, but the basic intent and the basic configurations were the same. There may have been one or two dimensions that because they were adapted to our headset were slightly different, but I haven't gone through it in detail.

Q Now, Mr. Mol, I would ask you a question that does not relate any more to that exhibit. The rest of that exhibit we will skip. Has Roanwell ever marketed a headset which used a single transducer for both transmission and receiving during your acquaintance with the company?

A During my time period in the company, I don't recollect -- I don't really recollect. We did -- there were certain transducers that could be used either way, but might be optimized one way or the other to make either a better microphone and a better receiver, but we did market a unit

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A I am afraid I am not familiar with one, but
Roanwell, of course, was in the business of supplying headset

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Mol-direct

components. It is quite common in that industry to take one vendor's earcup and apply another man's microphone and adapt it in many different ways.

I don't know of us marketing a headset that had the express feature of having one transducer that deliberately went both ways in a headset, but I am certainly familiar with the capability of the devices as they were, being able to go both ways.

Q I too am familiar with their being commonly used in other applications, but I do not know of their ever having been used in a headset and it seems to me in view of what you have just testified about adapting them -- well, I will ask it this way. Is it not true that if these units are so adapted with circuitry to be at their optimum efficiency for transmission, they will be less than optimum for receipt or if they are so adapted to be at their optimum for receipt, they will be less than their optimum for transmission? Is that not generally true?

A Yes, I think that is a fair statement.

End 6B

2 Q And this, then, is a bias against using a single
3 transducer in a telephone operator's headset or a radio
4 pilot's or air traffic controller's headset, it is a bias
5 against using a single transducer on grounds that in those
6 environments you want high fidelity both ways?

7 A Well, sir, I think -- you are talking about
8 fidelity. I think you can get almost equal fidelity with
9 the compromised one. It is not only fidelity, but noise
10 level in many other ways. Yes, there is an optimization
11 that you can do, but certainly the thing that readily comes
12 to mind is sound power devices which are both microphones and
13 devices can have more than adequate fidelity for communica-
14 tion purposes, talking purposes.

15 Q All right. Your counsel has cited as one of
16 the prior art references in this case the Pieringer
17 patent which is Plaintiff's Exhibit 43, and I will address you
18 attention, please, to that patent and ask the Court to look
19 at the Pieringer prior art reference.

20 Will you read that for a minute and familiarize
21 yourself with it, at least to the limited extent that you
22 can here.

23 (Pause.)

24 A It is a long patent.

25 THE COURT: What is he reading?

1
2 MR. ARNOLD: Pieringer patent, Plaintiff's
3 Exhibit 43, one of the prior art references cited by the
4 defendant in the case.

5 MR. BRADLEY: Perhaps I can state for the record
6 we are not relying on it. I have no objection to questions
7 to the witness about it, however.

8 MR. ARNOLD: We will make it very quick.

9 Q Maybe I can ask you this one question about it
10 very summarily, Mr. Mol.

11 If you were directing a research and development
12 project in headsets today or let's go back and say in 1961,
13 because this is the time when you were in the transducer art
14 and not in headsets, and let's say you were commencing to
15 get into headsets and you were about to do a research and
16 development project in headsets, would you feel that that
17 reference was helpful to you or to your fellow workers in
18 designing a headset as of 1961 when you were in the trans-
19 ducer art?

20 A Mr. Arnold, I just haven't had enough time to
21 read it. Frankly, I am not familiar with the thing. It is
22 not picturesque enough that I can determine quickly what
23 it is. I would like to answer you, but I am not familiar
24 enough with the patent.

25 Q You are not able to tell even from the commencing

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Mol-direct

picture that that is a reference which, if it came across your desk, you would throw in the wastebasket and go somewhere else looking for information circa 1961?

A I think it depends largely what it contains. Just because a patent is old doesn't cause me to throw it in the wastebasket. If it has any features in it that since that time have become common knowledge, yes, I probably would throw it in the wastebasket.

Q My question is addressed to a slightly different thing. Wouldn't you throw it in the wastebasket from a glance at the drawing without ever reading it?

A I certainly wouldn't.

Q You would not?

A No.

Q You would undertake to study that particular kind of a reference, having seen the drawing there, in hopes that it would teach you something about how you would build a new headset in 1961?

A It depends, I think, very much on my job function. If I happen to see it lying on somebody's desk, I don't think I would make any great attempt to get a copy. If somebody sends it to me or if it was present in a file which I had to study in order to determine headset development, I certainly wouldn't throw it in the wastebasket based on

1 gwb-4

Mol-direct

2 the drawing.

3 Q I am trying to now develop the reality of the
4 creative function, the design function, as distinguished
5 from what we do by way of hindsight in court.

6 In terms of the reality of the way research and
7 development people work and the way a manager manages the
8 research and development department, is there a reality in
9 the idea that anybody would ever bother to read a reference
10 like that from beginning to end if he was given a headset
11 design problem in 1961?

12 A It depends very much on the man's job function.
13 If my job function was to be the sole "technical expert,"
14 on headsets in a corporation and it was my responsibility
15 to know and keep up with the state of the art, I might very
16 well read it. If I was a designer on the board, I probably
17 wouldn't bother. But I certainly wouldn't throw it in the
18 wastebasket.

19 Q All right. I will address your attention, then
20 to Plaintiff's Exhibit 43, which is the Pritchett reference
21 in England --

22 THE COURT: You have the wrong exhibit number.

23 MR. ARNOLD: 42.

24 Q British patent 191 of 1878, and if I ask you
25 the same series of questions about that reference, would

1 your answers be the same as they were with respect to the
2 Pieringer reference or would you change them in any way?

3 A I think I would make an effort to read and see
4 what is there. I would not throw it in the wastebasket
5 without reading it, in other words. I might not read the
6 detailed claims, because I am not a patent man, but after
7 having read those claims and being familiar that there is
8 nothing in that particular patent that isn't well-known in the
9 state of the art, at that point I might very well put it
10 away or deep six it, because I don't think there is anything
11 disclosed in that headset that wasn't commonly known to me
12 as a non-headset designer. So certainly I don't think you can
13 say I would throw it away without reading it, but once you
14 ascertain roughly what is in it and it doesn't appear to
15 have any unusual features, at that point I think I wouldn't
16 bother giving it to a headset designer as a reference because
17 it contains well-known art.

18 THE COURT: Is the defendant still relying on
19 Exhibit 42 as a reference?

20 MR. BRADLEY: Yes, your Honor.

21 End 7A

1 THE COURT: What feature of it, the fact that it has
2 a voice tube shown in Fig. 5?
3

4 MR. BRADLEY: Yes, Fig. 5 is most pertinent.

5 MR. ARNOLD: Of course, part of our position,
6 your Honor, is that the voice tube was very well known in
7 the models that were marketed by Roanwell and advertised.
8 I believe it is shown in the first page of Exhibit 140.
9 It is page numbered 1. There were voice tubes in that micro-
10 phone that were well known throughout the industry
11 at the time because that was a headset being marketed at
12 that time by Roanwell and was generally known in the trade
13 to everybody that worked in the trade.

14 THE COURT: The voice tube in Exhibit 42 is
15 a smaller tube than is shown in Exhibit 140 or so it
16 appears from the drawing.

17 MR. ARNOLD: That may or may not be. Let's see
18 whether the witness can --

19 Q Are you familiar enough with the unit that is
20 page 1, the Model RM-33 of Exhibit 140, to tell us what
21 size voice tube was inside the housing which appears in
22 that particular unit?

23 A I could take some rough guesses. I think the
24 voice tubes -- there are two tubes in there -- are roughly
25 four and a half inches long, I think it is an elongated shape

1 qwrf 2

Mol-direct

2 about sixty-thousandths in one dimension and I believe about
3 two hundred thousandths in the other dimension.

4 THE COURT: That is the cross section?

5 THE WITNESS: Cross sectional area of each tube.

6 MR. BRADLEY: We have a model of that here, if the
7 Court would like to see it.

8 THE COURT: I don't know whether we can see the size
9 of the tube.

10 THE WITNESS: We can break it.

11 MR. ARNOLD: As a concept, at least, we did have
12 at least some voice tubes that were used there and that
13 is all that I will make of that.

14 We have no further questions, your Honor.

15 MR. BRADLEY: We plan to call Mr. Mol as our
16 witness, so I don't have any questions now.

17 I would like to just clarify one point and I am
18 not sure whether it is unclear or not.

19 It just seems to me to be. That's with regard
20 to page 78 of Plaintiff's Exhibit 140, which shows -- that
21 is the one that has the sketches A to D, and it talks
22 about, for example, under B, "No swivel advantage."

23 I think there was some reference to that as
24 being maybe the swivel of the voice tube in the current unit.
25

1 gwrf 3 Mol-cross

2 CROSS EXAMINATION

3 BY MR. BRADLEY:

4 Q I wish the witness would clarify whether that is
5 what he is talking about there or whether that is what the
6 document is talking about when it says swivel advantage.

7 A You are talking about the rotating ball swivel?

8 MR. ARNOLD: Let's show him the drawing and see if
9 that will help him recall.

10 A This swivel advantage is not talking about the
11 same swivel as is on that unit.

12 Q Would you explain what swivel advantage means on
13 this page 78 --

14 THE COURT: I am not sure that you are reading
15 this language correctly, at least insofar as the emphasis
16 goes. You are saying; "No swivel advantage," and I read
17 that as meaning that you have no swivel and that this is
18 an advantage, and the reason that you have no swivel
19 is that you now have the ear tube coming out of the bottom
20 and because of the stiffness of the ear tube the housing
21 does not swivel outwardly as you lean your head to one side,
22 is that correct?

23 THE WITNESS: No, sir.

24 MR. BRADLEY: This is what I thought was confusing.
25 I thought the witness could explain what this does mean.

1 gwrf 4

Mol-cross

2 THE COURT: All right.

3 THE WITNESS: We quickly found out that one of
4 the problems on the ear, the human ear, was that the plane
5 that would be basically described by the side of the
6 head and the plane that is in the back of the ear are not
7 coincident and they vary between different people. I
8 suppose you might find some people that have that all as one
9 flat plane, but I haven't found any so far.

10 So basically we found that in order for that hering
11 aid type of case to fit behind the ear, it would be an ad-
12 vantage to have essentially a case that is nonsymmetrically,
13 that is, ideally it would be in one plane up here and one
14 plane down here.

15 However, that would no longer make that headset
16 usable on either side, which is a disadvantage.

17 So what we tried to attain in the headset, if we
18 could, is an ability to swivel the two planes, in other
19 words, to rotate the transducer capsul with respect
20 to the hook in order to adjust it, and that was what was
21 meant, and we pointed this out very strictly to Unex,
22 and I think they were also aware of it, that is what we
23 meant with swivel advantage, the ability to be able
24 to swivel the plane of the capsule in regard to the plane
25 of the voice tube.

1 Gwrf 5

Mol-cross

2 I am glad you called that out. I thought it
3 was awful clear.

4 Q I have the two units, the R-70 and R-71, and I
5 wonder if you will point out on there what you are referring
6 to.

7 A I don't think there is very much doubt this is
8 a symmetrical unit which is not adjustable in terms of
9 what goes over the ear as well as the head.

10 This unit, however, is not. I can have a plane
11 this way that although it goes over the ear this way,
12 suddenly I can change the angle of the transducer to no
13 longer lie conceivably in this portion of the ear but
14 back in the hollow of the ear. That's what the swivel
15 advantage meant in this particular application.

16 I can see how the two could be confused.

17 THE COURT: All right.

18 MR. BRADLEY: Nothing further from Mr. Mol.

19 THE COURT: All right.

20 (Witness excused.)

21 MR. ARNOLD: Plaintiff rests, your Honor.

22 THE COURT: Are you ready to go right ahead
23 with your first witness, Mr. Bradley?

24 MR. BRADLEY: Yes, your Honor.

25 We had planned to question Mr. Hutchings and

1 qwrf 6

2 counsel I understand says he will be available later
3 today.

4 MR. ARNOLD: Yes, we will hold Mr. Hutchings
5 available until the trial is concluded for your pleasure.

6 MR. BRADLEY: The defendant calls Dr. Martin.

7 D A N I E L W I L L I A M M A R T I N ,

8 called as a witness by defense, having been previously sworn
9 testified as follows:

10 DIRECT EXAMINATION

11 BY MR. BRADLEY:

12 Q Where do you live, Mr. Martin?

13 A 7349 Clough Pike, Cincinnati, Ohio, 45244.

14 Q By whom are you presently employed?

15 A The Baldwin Piano and Organ Company.

16 Q What is your position with that company?

17 A Research director.

18 Q Would you just state very briefly your educational
19 background?

20 A My Bachelor's Degree from Georgetown College was
21 summa cum laude in physics and mathematics. My Master's
22 Degree and Ph.D were both from the University of Illinois,
23 majoring in physics with acoustics being my specialty within
24 the field of physics.
25

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2 Q Would you describe your employment background?

3 A I taught at the University of Illinois as a part
4 time instructor and at various times during my life I
5 have taught at other institutions such as Purdue
6 University Extension and am currently on the faculty of the
7 University of Cincinnati.

8 My engineering career began at the Radio Corporation
9 of America where I worked from 1941 until 1949 specializing
10 in the research development and design of electro-acoustic
11 devices and combinations of those in systems. These were
12 primarily for U.S. Navy applications from '41 to '45 and
13 Air Force intercommunications system applications from
14 '46 to '49.

15 In 1949 I went to the Baldwin Company as it was
16 called then as an acoustical consultant and research engineer.
17 Since that time I have been associated with that company
18 and its variously named successors in a number of
19 capacities ranging from consultant to director of research
20 and engineering.

21 During that period of approximately 25 years
22 I have been intermittently involved in Government contracts
23 between the Air Force and Baldwin for acoustical consulting
24 services and small project developments in the aircraft
25 communication field. Our function in this has been most

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1 1zrf 2

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2 of the time as an annex operation to one of the laboratories
3 at Wright Air Development Center and in the several cases
4 where we have done things for the Air Force in more recent
5 years, it has been to evaluate or compare various types of
6 transducers or systems that they are using or proposing to
7 use.

8 Q Do you belong to any professional organizations?

9 A Yes.

10 Q Would you state what they are?

11 A I have been a member of the Acoustical Society
12 of America since 1940 or '41. I became a fellow of that society
13 in the early '50s. I have served on the executive council
14 and in various editorial capacities.

15 I am a fellow also of the Audio Engineering Society
16 and served that organization as their national president.

17 I am a fellow of the Institute of Electrical and
18 Electronics Engineers and served for a time as the national
19 chairman of their audio group.

20 Q Have you written any papers in the field of
21 acoustics and do you have any patents in that field?

22 A I have written numerous papers in the journals of
23 all three of those societies and have approximately 25
24 patents.

25 Q Do you have any experience in making judgments as
to what might constitute a patentable idea or what might

2 be obvious to one skilled in the art?

3 A In addition to being an inventor of a number of
4 patents, I have had the volunteer assignment over a period
5 of about 25 years of reviewing certain classes of patents
6 for the journal, not with regard to validity but with
7 regard to their general content.

8 Being a physicist-engineer rather than a lawyer, I
9 am not prepared to make statements concerning validity.
10 Naturally, after this much association and being chairman of
11 the Patent Committee of my own company, I have opinions
12 concerning validity and concerning other patent matters
13 but I do not consider myself an expert and obviously have
14 not been so qualified.

15 Q I would like to hand you a copy of the
16 Defendant's Exhibit A, which is a copy of the Larkin Patent
17 in suit, and this patent has been discussed to some extent.

18 I wish you would just briefly describe the head-
19 set that it discloses.

20 A This is a headset in which the two transducers are
21 mounted to a connecting member supported on eyeglass frames.
22 From each transducer issues an acoustical tube. One of
23 these, which has been colored green on this copy, is a voice
24 tube leading from the talker's or wearer's mouth to the one
25 transducer serving as a microphone.

1 The other tube colored blue is going from the
2 receiver unit to the outer end of the auditory canal.
3

4 Q You say it is attached to a pair of glasses.
5 Would you indicate how it is attached?
6

7 A There is a spring clip on the side of this shown
8 in Fig. 7 and it appears that the glasses frame is
9 surrounded partially by this spring clip so that it can
10 be slid along the glasses frame.

11 Q You mentioned acoustical tubes. Could you
12 define what you mean by acoustical tube?
13

14 A To me, and I believe to most people in the field
15 of acoustics, an acoustical tube is a passageway through which
16 sound is transmitted.
17

18 Q Does it connote any particular length?
19

20 A No.
21

22 Q Does it connote, as far as you know, the establish-
23 ment of any resonance within the intended use of the tube
24 or the device containing the tube?
25

26 A An acoustical tube can be either resonant or non-
27 resonant, depending upon its own properties of internal
28 damping. This would have to do with diameter of the tube
29 and its length, or it can be damped by auxiliary means.
30 Whether it is damped one way or the other, it would still
31 be an acoustical tube if sound is transmitted through it.

THE COURT: The greater the diameter, the greater the damping?

THE WITNESS: The smaller the diameter, the greater the damping per unit length.

Q You referred to damping of resonances within the tube. What is the situation where there were no resonances occurring within the intended usable frequency range of the tube, would you still consider it an acoustical tube?

A Yes.

Q Do you understand my question? I am not sure that I was clear.

A The question I felt I was answering was whether or not a tube needed to have a resonance within its audio frequency range in order to be classified as an acoustical tube.

Q The answer?

A My answer is no, it does not have to have resonance within that range.

Q I hand you a copy of Defendant's Exhibit Z and I wonder if you could state what the title of that is and the author?

A This paper is entitled, "The Use Of Acoustical Tubes To Improve Microphone Performance."

The authors are W. K. Larkin, and A. S. Dennis, Ph.D.

Q I believe the agreed facts indicate that this is a paper co-authored by the patentee Larkin and presented at a meeting in New York at the Society of Automotive Engineers of the SAE in April 1962.

Would you turn to the last page of this article or paper and describe what is shown in Fig. 4-A which appears on that page.

A According to the caption Figure 4-A compares the frequency response of the MS-50 microphone with a straight acoustical tube, curve A, and without the tube, curve B.

1 Q And what do you find in Curve A? And particular
2
3 I am referring to the upward and downward excursions.

4 A Curve A exhibits very clearly a series of
5 quarter wave resonances in which the lowest major peak at
6 about 400 hertz, we have been saying cycles here, but hertz
7 is the proper present term, just abbreviated "hz." About
8 400 hertz the first peak occurs and a simple calculation
9 of the quarter wave resonance for the length of tube stated
10 at the bottom of the page to be the order of 9 inches will
11 give a resonance frequency of about 400 hertz. The rest
12 of those major peaks are what are called odd integer multiples
13 of that same frequency.

14 And these are to be found in the frequency series
15 associated with a closed organ pipe, for example. One
16 closed at one end. This is in contrast to the half wave
17 length series occurring from an open organ pipe, one open at
18 both ends, or a voice tube, it can be just as easily as an
19 organ pipe.

20 My point is that instead of having all of the
21 integer multiples as one would have with half wave resonances,
22 you have in this case only the odd numbered ones because
23 that is the kind of series you get with a closed tube.

24 Q Do you know why in this tube, which is a part
25 of the MS50 headset, you get quarter wave resonances rather

1 zb-2 Martin-direct

2 than half wave resonances?

3 THE COURT: You don't have to explain that for
4 my benefit, but maybe you want to for the Appellate record.

5 A The answer is rather simple. This is an indica-
6 tion that the inner end of the tube is associated with a
7 high acoustical impedance and probably mechanical impedance
8 type of diaphragm.

9 THE COURT: So it is effectively closed in, so
10 you have a tube closed at one end and open at the other end
11 and you have odd integer multiples?

12 THE WITNESS: Yes.

13 Q Could the tube also be used with a low impedance
14 diaphragm microphone?

15 A Yes.

16 Q Would the characteristic curve then be different?

17 A The frequencies would be different and their
18 spacing would be different with a low impedance termination.
19 And in fact, the Beranek reference has been shown here for
20 probe tubes, to the extent that it does exhibit resonances,
21 is such a case.

22 Q By "such a case," you mean the case of half wave
23 resonances?

24 A I believe so.

25 Q Is one of the parameters in deciding how to

1 zb-3

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2 design a microphone with an acoustic tube the impedance
3 characteristics of the microphone itself?

4 A You can make a voice tube work with either type
5 of microphone. The results will not be identical, but
6 it is very practical to do it either way.

7 Q But is the type of microphone a parameter that
8 is considered in designing the microphone with a voice tube?

9 A Yes, it certainly is. In my previous testimony
10 I believe that I mentioned the effect of leakage between
11 the tube and the microphone. I could also have mentioned
12 that in addition to the resistance and inertance associated
13 with the leakage, there is also the loading effect of the
14 air cavity between the end of the tube and the microphone
15 diaphragm.

16 Q Do you know how long it has been known generally
17 in the field that the impedance of the microphone is a
18 characteristics to be considered in designing a microphone with
19 a voice tube?

20 A Well, certainly in the time of Olney it was.

21 Q By that what time frame are you referring to?

22 A The middle forties.

23 Q Assuming that one was to select a tube so as to
24 have a resonance point within the intended frequency range
25 of the device and to use a high impedance microphone,

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1 then how would the length of the tube, for example, compare
2 with the length that has been discussed here of a tube
3 being required to be of the order of an inch and a half (n
4 Dr. Romanow's testimony?
5

6 A I believe at that time he was speaking of
7 half wave resonance and in this MS50 example, it appears to
8 be quarter wave resonance and the difference would be
9 a length ratio of 2:1, so that the inch and a half which
10 he mentioned in this case would be approximately three-
11 quarters of an inch.

12 Q Would you turn to the first page of the text
13 of the Larkin paper. I refer you to the second sentence
14 under the abstract where it states, "The outstanding feature
15 of the unit is its use of a acoustical tube to transmit sound
16 from the corner of the user's mouth to the microphone."
17 And then also on the following page under the Roman number II,
18 the first sentence states:

19 "The central feature of the MS50 system is
20 its acoustical tube."

21 Do you know whether the use of an acoustical
22 tube as a voice tube with a microphone in a headset arrangement
23 was known in 1960?

24 A Long before then.

25 Q In the middle of Page 1 of the Larkin article --
let me show you the last sentence in the second paragraph

1 zb-5 Martin-direct

2 under Roman numeral I, there is a statement:

3 "A standard earpiece is used to carry sound
4 from the receiver unit to the ear."

5 Do you agree with that statement that Larkin
6 used what was a standard earpiece in 1961?

7 A Yes, the illustrations I have seen in connection
8 with this indicate that it was a standard earpiece as had
9 been used for some time in the hearing aid field particularly

10 Q Had it been used in the headset field?

11 A Well, acoustical tubes from the diaphragm to
12 the auditory canal have been used in the headset field, as in
13 my own patent, and I did not consider it to be new at the
14 time of my patent. It was not a feature of my patent, which
15 was more directed to the type of ear seal.

16 Q Dr. Martin, I refer you to Plaintiff's Exhibit
17 16, which is a Plane-Aids flyer, which the agreed facts
18 show is a pair of eyeglasses with a radio in one bow of the
19 eyeglasses or temple bar and a tube to carry the sound from
20 that radio down to one of the ears. This had been on the
21 market by Plane-Aids before they became Plantronics, and
22 I ask you whether that unit contains such a standard ear-
23 piece?

24 A This Xerox copy does not show the termination of
25 this tube very well. So I really can't say from the

1 zb-6 Martin-direct

2 picture ---

3 THE COURT: What exhibit number is that?

4 MR. BRADLEY: That is Plaintiff's Exhibit No. 18.

5 THE WITNESS: 16.

6 MR. BRADLEY: 16.

7 Q It is not entirely clear in the orig-
8 inal, but I think it may be a little bit clearer.

9 A Yes, it is. I can see more detail in this
10 and it does appear to be one of the standard types of ear-
11 pieces.

12 Q I refer you to Defendant's Exhibit D, and the
13 first page of which contains a short article from the
14 Santa Cruz Sentinel, dated August 6, 1961. And the agreed
15 facts indicate that this is a hearing aid eyeglass unit
16 made by Maico, to which the plaintiff has added a voice tube
17 down to the mouth to convert it to a headset. I ask you
18 whether this unit contained a standard earpiece as you
19 understand that?

20 A Yes, it does.

21 Q I refer you also to Defendant's Exhibit C and to
22 one particular reference which is a Telex flyer on the
23 Telex Twinset unit, which is dated October 1955, and appears
24 behind Tab 2B of Defendant's Exhibit C. I ask you
25 if this unit shows what was in 1960 or 1961 a standard

1 zb-7

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2 earpiece in headsets?

3 A Yes, there were many of these.

4 I saw them and I certainly considered the ear-
5 piece portion to be standard.

6 Q I note that on the back of that reference, there
7 is an indication that it was CAA approved and it is followed
8 by a CAA number.

9 Do you have any idea as to when that received
10 CAA approval?

11 A It was being used for purposes that would have
12 required CAA approval in the early fifties.

d 8B

2 Q Dr. Martin, I show you a copy of the file
3 history of the Larkin patent in suit, which is Defendant
4 Exhibit B, and I would like you to explain the references --
5 this also contains the references that were cited -- I
6 would like you to explain those briefly. Most of these
7 have been discussed, so I remind you of that so that we may
8 be able to curtail the explanation.

9 Would you turn first to the Olney patent which is
10 in that Defendant's Exhibit B and is shown by a tab with
11 the Olney name on it.

12 THE COURT: Exhibit C, I think you meant to refer
13 to.

14 MR. BRADLEY: The file history, your Honor, is
15 Exhibit B.

16 Q Would you just briefly explain the headset shown
17 in the Olney patent?

18 A The headset in the Olney patent is one in which
19 there is a combination of receiver unit and microphone unit
20 supported upon a headband with one or more tubes extended from
21 the microphone to the mouth of the wearer or the vicinity
22 of the mouth of the wearer.

23 When one tube is used, it is a pressure-type of
24 microphone operation. With two tubes, it is a
25 dipole or gradient or noise-canceling type of acoustical

1 gwb-2

Martin-direct

2 operation.

3 Q I meant to ask you, Dr. Martin, whether you have
4 come in contact with the Olney headset or this Olney patent
5 prior to your work in connection with this case.

6 A Yes, I heard the original talk given by Olney
7 at the Acoustical Society meeting, I believe, in 1944,
8 the spring of '44, and I read the subsequent paper in the
9 Acoustical Journal and was familiar with both the paper and
10 this patent at the time that I helped design the M33 micro-
11 phone at RCA when we were developing an entirely new phone
12 system for United States Air Forces in the period of 1947 to
13 1949.

14 THE COURT: We probably should take our noon
15 break now. Two o'clock.

16 (Luncheon recess.)

17 -----

DANIEL WILLIAM MARTIN resumed.

MR. BRADLEY: Your Honor, I had a brief listing made of the defendant's exhibits we will be referring to in the course of the further examination of Dr. Martin and I had it put on the bench.

THE COURT: I have it here.

DIRECT EXAMINATION (continued)

BY MR. BRADLEY:

Q Dr. Martin, you were discussing Defendant's Exhibit B and particularly, the Olney patent in Defendant's Exhibit B.

Did you state where the transducers are located in the Olney headset?

A I believe I said that they were both located at the ear, as they are, and supported by a headband.

Q Are they in a common housing?

A Yes.

Q Would you mention very briefly the purpose of the two-tube arrangement of the Olney headset as compared with the one-tube arrangement?

A With one voice tube, the diaphragm responds to the sound pressure transmitted through the acoustical tube from the lips. With two tubes you have a pressure

gwb-2

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1 differential operating on the microphone diaphragm because
2 sound reaches the diaphragm from both sides, each side being
3 serviced by one tube, and the terminations of the tubes
4 at the lips are so arranged that one tube ending is closer
5 to the lips than the other.
6

7 Q Is it basically the idea that the voice goes in
8 one of the two tubes but the background sound is in both of
9 the two tubes and cancels?

10 A As far as noise cancellation is concerned, that
11 is correct.

12 Q Would you refer to Column 10 of the Olney patent
13 under the heading "Other modifications," where the reference
14 is made to the single voice tube arrangement. You have
15 the portion colored yellow there. Would you just explain
16 what has to be done to convert this to the single tube
17 arrangement?

18 A The mouthpiece at the end of the two tubes
19 is no longer needed and either one of the tubes may be
20 omitted.

21 Q Would one of ordinary skill in the art know how
22 to make it from that disclosure in the Olney patent, that
23 is, make a single voice tube arrangement?

24 A Yes.

25 Q I am thinking, of course, in the context of all

1 of the rest of the disclosure that discloses the two tube
2 arrangement.
3

4 In other words, would it be enough for one
5 skilled in the art in the forties or fifties to be able
6 to make this one tube arrangement from what is disclosed
7 in the Olney patent?

8 A A really sophisticated part of the Olney in-
9 vention is the use of two tubes. It would be obvious, I
10 believe, to use one or to omit one if you did not want the
11 noise cancellation feature.

End 1A

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2 Q Would you refer to column 1 of the patent very
3 briefly, the text, and indicate the significance of that one
4 sentence there that is colored yellow?

5 A This is pointing out the advantage of supporting
6 the transmitter or microphone unit with the receiver
7 unit at the operator's ear and says that this is an
8 advantage particularly if the microphone unit is of a small
9 size.

10 Q What had been done previously?

11 A It had been quite common in the telephone field
12 to have a larger microphone supported upon a chest
13 plate.

14 Q Would you turn to column 4, toward the bottom of
15 the column, again where it is colored yellow about line 65.
16 There is an indication there that the dipole mouthpiece is
17 worn close to the lips although the position is not critical.

18 Do you know whether or not the positioning is
19 critical in the Olney headset?

20 A Any dipole microphone is more critical in its
21 placement than a pressure microphone of the same construction.
22 On the other hand, a voice tube of small cross section
23 is more critical than a horn would be of larger cross
24 section.

25 I am speaking concerning the way the sound level

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1 gwrif 2 Martin-direct

2 changes or the sound pickup changes as you go from
3 here to here or from here out to here. There is more change
4 in level with distance for a small tube than there is for
5 a large mouth horn.

6 Q The record won't pick up the here to here part,
7 Dr. Martin. I understand first when you said here to here
8 you were moving laterally and then here to here was moving
9 forward out from the mouth, is that right?

10 A The second motion is along the axis of speech and
11 the first one was at right angles to that along the mouth
12 line.

13 Q In the case of the Olney voice cancelling mike, would
14 it be more sensitive in a vertical direction or horizontal
15 direction or horizontal? I refer you to Fig. 1.

16 A It shows in Figure 1 that the orifice at the outer
17 end of the upper voice tube is positioned closer to the
18 wearer's mouth.

19 So that is the one where that has the advantage in
20 time and phase. If you move this mouthpiece upward until
21 the center line between the tubes came down to the mouth,
22 with this particular mouth piece you would be in the
23 innermost portion of the figure eight pattern associated
24 with a dipole microphone.

25 Then as you raise it up even further, if you could,

1 gwrf 3

Martin-direct

2 your nose might interfere, but if you did, you would again
3 come on to the larger part of that lobe of response. Of
4 course, it doesn't have to be designed that way. There
5 are other ways of designing it, such as we did in the M-33
6 microphone, where we had one hole on the front side and one
7 hole on the back side, and then this particular problem did
8 not exist.

9 We will speak to that more later. The problem you
10 are referring to, the dipole mike of the Olney Patent in
11 terms of the sensitivity of positioning, I understand that
12 would not be present where you just used the single tube
13 version of the Olney headset, is that correct?

14 A The single tube version would neither be as critical
15 with regard to position nor would it provide the
16 noise cancelation.

17
18
19
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24
25 App. 619

1 1zrf 2a pm 1 Martin-direct

2 Q Would you look again at Fig. 1. I note that the
3 headset is attached to, that the earcup there is attached
4 to a headband.

5 Do you know whether it is detachably attached?

6 A Well, in Figure 3 it shows what is -- what was
7 then and to some degree still is a rather standard way of
8 supporting an earphone case within the yoke of a headband.
9 There are two opinions that come into recesses in the side
10 of the case and in such an instance if you want to detach
11 it, you spread the yoke apart and it falls out.

12 Q What if you wanted to move it, the voice tubes
13 from the vertical position as shown in Fig. 3, for example,
14 to an inclined position as shown in Fig. 1?

15 A Then you would have pairs of recesses at various
16 locations around the periphery of the case. So that you
17 could rotate it.

18 Q Do you know whether the headset could be worn on
19 either the right-hand side or left-hand side of the
20 head?

21 A It could be simply by having another pair of
22 recesses in the case so that when you switch from one to
23 the other, you would rotate it.

24 Q It has just a single earcap, is that correct?

25 A That's what is shown here.

2 Q You mentioned the M-33 mike --

3 THE COURT: Actually, Doctor, it seems to me that
4 the semi-circular band that engages the earphone body is
5 slidable in a slot, a circular slot in the casing, so that
6 all you have to do is not create any more holes but simply
7 slide the earphone around, that is, rotate it within that
8 semi-circular band or yoke.

9 THE WITNESS: Yes. You are referring to the
10 dashed line, the circle inside the solid circle.

11 THE COURT: Yes and also to Figure 2, if you
12 will look. You see the entire slot.

13 THE WITNESS: Yes. There is an extra piece on
14 the top half of the unit.

15 THE COURT: That's right.

16 THE WITNESS: I believe it is for this purpose,
17 I agree.

18 THE COURT: So you don't have to create any more holes
19 The provision is already there.

20 THE WITNESS: The groove is not shown but it cer-
21 tainly can be done that way.

22 THE COURT: Well, the groove is shown. If you
23 look at Figure 2. It is also shown in Figure 1 as you
24 indicate by the broken line, is that correct?

25 THE WITNESS: I certainly would agree.

2 THE COURT: All right.

3 Q Well, is there a question of once you turned it
4 over at a given signal to get, for example, as shown in
5 Fig 1, how it stays in that position?

6 THE COURT: Friction.

7 A It was that problem which led me to assume that
8 detent holes would be used but I think friction could do
9 it.

10 Q You mentioned the M-33 microphone and your work
11 in connection with that and I hand you Defendant's Exhibit
12 ZZ-1 and Defendant's Exhibit ZZ-2 and ask you if you would
13 state what they are.

14 A These are the two sides of a Roarwell data
15 sheet for the RM-33 microphone which is a Roanwell equivalent
16 of the M-33/AIC military microphone. You can see that the
17 AIC number is given on this picture as well.

18 Q What is ZZ-2?

19 A That is the other side of the same sheet. It
20 shows the physical dimensions and provides a table of
21 technical data.

22 Q I'm sorry. The ZZ-2 is the actual physical
23 model itself.

24 A Excuse me. The physical model is a microphone
25 of the type I just named, of which many tens of thousands

2 if not more were made for the Air Force, developed
3 in the period of 1947 to '49, and produced by at least
4 three manufacturers, RCA, Roanwell and Electrovoice, through-
5 out the '60s and on into the '70s -- throughout the '50s,
6 on into the '60s and I think some are still being made.

7 Q Were you personally involved in the development
8 of this microphone?

9 A I was the technical coordinator of the research
10 contract between RCA and the Air Force under which this
11 was one of the items developed and I was personally
12 involved with the principles chosen and with some phases of
13 the microphone design.

14 Q Is this a noise cancelling microphone?

15 A Yes. This is a microphone based on the same
16 acoustical principles as the Olney patent and we were not
17 only aware of that at the time that we designed this
18 microphone but one of the purposes of the Air Force
19 contract was to bring into the Air Force intercommunication
20 system as many of the ideas and inventions and concepts
21 as we could find which had not been fully realized in the
22 military system.

23 Q Could you point on Exhibit ZZ-2 to the place
24 where the acoustic tubes are located and to where the
25 transducer is located?

1 A The transducer is located in this round part that
2
3 projects from the larger part of the case. The tubes are
4 parallel to each other in a curved vertical path and one
5 tube is terminated by an opening toward the mouth through
6 this wind screen and the other one is terminated away from
7 the mouth by the other side of the wind screen.

8 Q Are the tubes one above the other or are they
9 side by side?

10 A One above the other.

1 Q Could you just hold that up to your face to show
2 how it would be worn.

3 A This is the manner in which it would be worn.
4 If you were in a very high ambient noise level, you would
5 probably wear it toward the center where you would be willing
6 to accept whatever plosive sounds might become more prominent
7 in order to gain a higher signal to noise ratio. In
8 other places where the noise level was not so high, you
9 could use it here or, as I am sure since it is pivoted, when
10 there was no communication problem of any severity, they
11 would probably wear it clear out here somewhere and accept
12 the somewhat reduced level in speech.

13 Q Could you hold it by the brackets so it would be
14 clear where the entire microphone is located in relation to
15 your face.

16 A It was slidable, to take care of both different
17 wearing conditions and physiology of the wearer.

18 Q There is no headphones with that microphone
19 as you hold it in your hand, are there?

20 A No. This is just a microphone.

21 Q Do you know what headphones it was intended to
22 be used with or was it intended to be used with some par-
23 ticular head phone?

24 A Yes, it was intended to be used interchangeably
25

zb-2

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1 on either a headband supported headset or a helmet type of
2 headset, both of which were developed on the same contract.
3 However, because of the nature, the detachable nature and
4 the relative ease of mounting this bracket or this wire
5 frame, it could be used with almost any microphone. It could
6 have been used with the HS30 microphone of World War II days,
7 which was a very lightweight headset with rubber tips on
8 them.
9

10 Q I think you may have misspoke when you said it
11 could have been used with any microphone.

12 A Excuse me. I meant headset.

13 Q Do you know whether the microphone transducer
14 in the M33 unit is a high or low impedance element?

15 THE COURT: Acoustical impedance.

16 I could answer it either way.

17 Q Would you answer both ways?

18 A All right. High and low is a relative matter.
19 Compared to the magnetic diaphragm units which had previously
20 been common in Air Force use, the electrical impedance of
21 this unit was low.

22 THE COURT: We are not interested at all in
23 electrical impedance. Only in the acoustical impedance.

24 THE WITNESS: The acoustical impedance of this
25 microphone is also somewhat lower than would be the case

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for a magnetic diaphragm construction.

Q Did you mention when the M33 was completed and delivered as a unit?

A I personally delivered the research model system, including microphones of this type, in July of 1949, to Wright Field.

Q Do you know where they subsequently became used and if so, for over what period of time?

A They went into production, I believe, in late 1950 or 1951, and are still being used in the Air Force. They have been somewhat succeeded by modified models but they are still in use.

Q I assume you have operated one of these units yourself, is that correct?

A Many times.

Q Have you ever operated it with one of its voice tubes disconnected or not operating?

A One of the standard tests in research design and even production, quality control type of thing, for this microphone is to seal one tube and run its response curve, seal the other tube and run its response curve and compare the two to see that they do match properly so that the gradient action will occur in good degree.

Q Would it be an operative instrument with one of

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its tubes sealed in the manner you have indicated?

A Yes, sir.

Q Can you discern from this whether the single voice tube arrangement in the Olney patent were to be an operative instrument as it is converted to a single voice tube device as disclosed in the Olney patent?

A There is no doubt in my mind that the single tube version of Olney would be operative.

Q Would this be true even with the expansion of the back cavity of the microphone, which is mentioned as a suggestion or a preferred way in the Olney patent?

A Yes. As evidenced by the fact that when you seal up one of these holes, you still have the tube plus whatever back enclosures on the other side of this diaphragm, so it would still operate that way quite satisfactorily. Not identically but quite satisfactorily.

Q Would you turn briefly to the next patent cited by the Patent Office in Defendant's Exhibit B, which is a Rackham patent. I don't think this patent is terribly pertinent so I wonder if you would just state very briefly what it is.

A It is a microphone stand of -- what would appear to be a microphone stand where the microphone is actually at the base of the stand and the stand is used as a voice

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1 tube to conduct speech sound from the upper end of
2 the stand to the microphone at the base.

3 Q It is essentially a standup microphone?

4 A Yes.

5 Q Would you turn to the next patent that was cited
6 by the Patent Office, which is a Dreher patent. This patent
7 as you know, has also been discussed and I wonder if you
8 would just briefly state what is shown in this patent?

9 A This is a headset supported by the molded
10 insert itself using a single transducer and with an acoustical
11 tube from the transducer to the ear canal and another tube
12 from the transducer to the mouthpiece or vice-versa, and
13 these two tubes are joined together at a Y-point within the
14 molded insert.

15 Q Does the acoustical voice tube have the number
16 21?

17 A Yes.

18 Q Would you point out the full length of it,
19 of what you referred to as an acoustical eartube?

20 A The acoustical tube for the ear reception runs
21 from the transducer 16, past point 18 which is the location
22 of the Y that I mentioned, and to point 19, where it enters
23 the auditory canal.

24 Q So you were referring to the passage through the
25

1 ear mold rather than the ear mold structure itself, is that
2 correct?
3

4 A When I say acoustic tube, I am generally refer-
5 ring to the passage because there is a slight distinction
6 made in acoustics between acoustic and acoustical. Acoustic
7 pertains more to the wave itself, where acoustical is a
8 more general term that can be applied to many other things.

9 Q Would you refer to the passage as an acoustical
10 tube or an acoustic tube or both or which?

11 A Well, I wouldn't basically belabor the point, but
12 I guess strictly speaking the acoustic tube is the passage
13 and whatever is around it could be called an acoustical tube,
14 but whatever is around it depends upon the shape of the par-
15 ticular device.

16 Q Well, as far as the general field goes, what would
17 the passage through the ear mold be known as in the field?

18 A You wouldn't always call it the same thing.
19 You might call it an acoustical duct instead of an acoustical
20 tube, but to most people I know in this field, it is called
21 a tube.

22 Q The reason I asked you about the field generally
23 is that you were indicating what you would call it. I am
24 interested in establishing what it is generally called in
25 the field. That is the point.

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A The part that the sound is transmitted through would usually be called the acoustic tube and that is the air in the hole.

Q Did you say how many transducers there are?

A Yes. There is one transducer in this case.

Q Do you know whether it operates as a microphone or receiver?

A It functions in both of these respects.

Q At the same time?

A It can.

End 2B

App. 631

2

Q Does it in the operation of the Dreher patent?

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A I believe there is an amplifier in this. Yes, in Fig. 6 there is an amplifier. When there is an amplifier you have to alternate the connection whether you want to receive or to be received by someone else. IN a sound powered system, where there is no amplifier, it would not be necessary to have a switching arrangement.

Q Can you state where the voice is picked up in the headset of the Dreher patent?

A Sound is picked up in two different places, but principally from the mouthpiece. There is also some sound reaching the transducer from the ear canal after it has been transmitted from the oral cavity through the structure of the head into the ear canal. But this is a much weaker sound than is picked up directly in front of the mouth.

Q Have you ever personally worked on picking up sound within the ear canal?

A Yes. I discovered this independently although I was not the first discoverer, I found later. I discovered it in 1942 when I accidentally connected up the transducers incorrectly on a headset microphone that I was developing for the Navy. I accidentally got one of the earphones connected where the microphone or transmitter should have been and discovered that I was listening in one ear to speech

1 sound that I was picking up in the auditory canal of the other
2 ear.
3

4 Q Did you make any measurements as to sound level
5 and particularly any comparison between sound level from
6 the ear canal and sound level from the mouth?

7 A Yes. I was interested in the possibility of
8 having a hand-free headset with no microphone or no tube,
9 and so I took a small transducer with a short acoustical
10 tube which I was already working on for another purpose,
11 and it was the type that I had discovered this phenomenon
12 with. I took that and put it in front of my lips and
13 spoke into it this way (indicating), put it back in my ear,
14 put a shell around it to give additional insulation and
15 spoke further and determined that approximately thirty
16 decibels or a power ratio -- yes, a power ratio of 1000:1
17 existed between the output in these two different modes of
18 operation.

19 Q I would like to translate that into the Dreher
20 headset where the transducer that is doing the picking up
21 of sound from the mouth is not located in front of the mouth
22 itself, but is located at the end of what you have indicated
23 as voice tube 21.

24 Have you made any measurements or do you have any
25 knowledge as to what the relative sound at the transducer

16 in Dreher would be in comparison with that coming from the ear canal or that coming from the mouth?

A There would be some loss of level in tube 21. Since I don't know what diameter or exactly what length is involved, I would have to make an estimate on how much that loss might be. But even if the loss were as much as 10 decibels so that there would be a difference in sound pressure at point 18 of -- there would still be a difference of 20 decibels for sound entering at point 19 and sound entering at point 22 in favor of the sound entering at point 22, and this would be a 100:1 ratio on sound power.

Q You say even if the loss is 10 decibels in the voice tube. Might it be 20 or 30 decibels in the voice tube?

A If you made the voice tube five mills in diameter and 10 inches long you might run into something like that, but I doubt very much if Dreher did it that way and I wouldn't either.

Q Have you yourself made measurements in voice tubes that would be the size that would reach from the mouth to the ear?

A Yes. The 10 decibel figure that I mentioned would be a reasonable estimate for such. It corresponds to a measurement that I have made on such a tube in about

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1943, or 1944.

Q I hand you a copy of Defendant's Exhibit G which is an article by Herbert Oyer, and I refer you particularly to the sentence -- let's say the second paragraph of the article. It refers to Bekesy and Rosenblith, and after mentioning those names, in the following sentence it says:

"They state that the vibrations of air in the oral cavity are transmitted from the cheeks to the lower jaw and that the attenuation between the oral cavity and the ear canal was 40 to 50 decibels."

Is that consistent with what you have indicated or is that different?

A It is consistent because they are talking about the sound pressure inside the mouth as compared to the sound pressure in the auditory canal. I was talking about the sound pressure outside the mouth in comparison to what is in the auditory canal and the sound pressure inside would be higher than outside.

nd .3A

1 3b pm gwrf 1 Martin-direct

2 Q Do you know who Mr. Oyer was associated with
3 at the time he wrote this paper?

4 A He was a colleague of Dreher at Ohio State
5 University.

6 Q Do you know whether the headset of the Dreher
7 Patent will operate effectively as a headset with this
8 intercommunication between the channel to the ear and the
9 channel to the mouth?

10 THE COURT: Let me ask this, Mr. Bradley:

11 Why are we pursuing this at such length? It
12 doesn't seem to me to be a particularly important point.
13 Maybe I am mistaken and you can enlighten me.

14 MR. BRADLEY: I wanted one question on the
15 operativeness since plaintiff's witness seems to indicate
16 with these passages being communicated with each other
17 it was a very poor design.

18 THE COURT: I think that wasn't the point. The
19 point was that the large volume of that chamber 18
20 constitutes a shunt on the passageway 21 which reduces
21 the acoustic impedance and therefore reduces the
22 efficiency of the device for purposes of picking up and
23 transmitting speech, not the fact that that tube 11 goes
24 into the ear.

25 MR. BRADLEY: Your Honor, I think I was addressing

1 myself perhaps inartfully to what you just indicated, that
2 the efficiency is reduced and I am trying to establish
3 whether or not it is an operative device.
4

5 THE COURT: It has nothing to do with the fact
6 that some sound is coming through that tube 19 or 11. It
7 has to do with the volume in that chamber 18.

8 MR. BRADLEY: I understand, your Honor.
9 I passed the first point about the pickup of sound and I
10 just had one question on the operativeness if the witness
11 knew.

12 THE COURT: All right.

13 A The presence of the tube into the ear will obviously
14 have some acoustical effect upon transmission of sound
15 from the mouthpiece to the transducer, but the effect can
16 be made very small and would be made very small with tubes
17 of the general diameter range typical of earpieces and voice
18 tubes.

19 Q In your opinion, would it be an operative device
20 at all?

21 A Definitely. It would work. There is no doubt in
22 my mind.

23 Q Dr. Martin, I refer you to the tab in Defendant's
24 Exhibit B which you have in front of you that has the
25 word "Amendments" on it and particularly page 5 of

1
2 that document entitled "Amendments." In the part where
3 it is colored yellow there is a statement:

4 "All of the claims have been amended to define
5 the headset in which the transducers are held adjacent
6 to the wearer's ear and in which two tubes are used" -- the
7 word "two" being underscored -- "one from the microphone
8 to the mouth and the other from the receiver to the ear.
9 This arrangement is not shown in Dreher, who has only one tube
10 nor by the other art stated by the examiner."

11 Do you agree with that statement?

12 A No, I don't, because Dreher has two tubes.

13 THE COURT: Where were you reading from, Mr.
14 Bradley?

15 MR. BRADLEY: Page 28 of the file history, your
16 Honor.

17 Q Have you looked through the entire file history,
18 Dr. Martin?

19 A Yes, I have.

20 Q Did you notice any comments in the file
21 history calling attention to either the early Plane-Aids
22 device with the ear tip or the early hearing aid eyeglasses
23 with the ear tip or to the Twinset with the ear tip? By
24 ear tip in each of those cases I mean ear tube.

25 Do you know whether they are referred to in the file

1
2 history?

3 A I saw no reference to them.

4 Q I would like to discuss briefly certain prior art
5 which is not in the file history. I am now referring to
6 Defendant's Exhibit C.

7 Would you turn to Tab 1 of Defendant's Exhibit C.
8 This shows a British patent which is dated way back in 1878:
9 is that correct?

10 A Yes.

11 Q Would you, just looking at the figures, state
12 whether Figs. 1 and 2 show headsets or handsets?

13 A 1 and 2 show handsets.

14 Q Would you take up Figs. 3, 4 and 5 individually
15 and let's take Fig. 3 first and state what that shows?

16 A Fig. 3 shows a headset because a headband and
17 chinstrap are indicated by the dashed lines, and coming
18 to one of these enclosures over one ear is a voice tube
19 which on this copy has been colored green.
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Q And what is shown in Figure 4?

A Figure 4 is a headset supported by headband, straps or springs I believe it says in the specification, and a chinstrap with ear tubes coming -- receiving sound from a transducer that is mounted on the shoulder of the wearer. The tubes that are colored blue are the ear tubes and in this case there is a short tube with a mouthpiece on it that receives voice sound going to the same transducer.

Q Is that colored green?

A That is colored green. In Figure 5, which is essentially a sideview of Figure 4, it doesn't show the headband in Figure 5 but the headband is mentioned in the text.

The biggest difference is that instead of having a short tube with a mouthpiece, it has a long voice tube coming up to the user's mouth.

Q In Figure 4 there is -- well, let's say on the left lapel is one transducer. That's essentially a telephone instrument, is it not?

A That's right. It was probably a magnetic unit because that would have been the type used, I think, at that time.

Q And --

2 THE COURT: That is a single transducer for both
3 receive and transmit?

4 THE WITNESS: Yes.

5 THE COURT: And sound powered?

6 THE WITNESS: Yes, that's the only way it
7 would be practical and in the primitive telephone systems
8 of that day, the local operations at least were sound powered.

9 Q The microphone and receiver here were used alter-
10 nately or is this what you explained before, they were
11 both used at the same time?

12 A They could be used simultaneously in this system.

13 Q In other words, a single instrument at the same
14 time would operate both as microphone and as receiver?

15 A Yes.

16 Q What is the dotted unit shown in Fig. 4 on the
17 right lapel?

18 A This is a second unit that is shown as an
19 alternative in case one wishes to have a separate unit
20 for transmission and reception.

21 Q What is the purpose of connecting these tubes
22 to the cap of a telephone instrument?

23 A To allow people to have hands-free operation
24 so that they can write or do other things with their
25 hands while speaking and listening over a telephone system.

2 Q Is this the kind of unit that in the old days
3 you spoke into and then you moved up to your ear and
4 listened with the same instrument?

5 A Without the tubes you probably would do that,
6 yes.

7 Q Did you indicate whether the tubes in this case
8 are what you would call or what would be known in the trade
9 as acoustical tubes?

10 A They are.

11 Q Would you turn to Tab 2. Tab 2 is the Olnev
12 Patent that you have already discussed and I think we can pass
13 that and I wish you would turn to the green side tab that
14 is also behind Tab 2 which refers to a paper and just for
15 purposes of the record state what that is?

16 A This paper is a scientific description and publi-
17 cation concerning the headset that is also described in the
18 Olney Patent.

19 I heard this paper given at a meeting of the
20 Acoustical Society. The paper was given in the spring of
21 '44, although the manuscript wasn't received until the
22 fall.

23 Q Would you turn to the next green tab and just state
24 what that is?

25 A This is an advertising flyer for a Telex Twinset.

2 Q I am sorry.

3 A Did I go too far?

4 Q It's the green tab.

5 A I went much too far, didn't I.

6 Thank you.

7 These are two pages from the program of the 29th
8 meeting of the Acoustical Society in the spring of 1944
9 containing, among other things, the abstract of Olney's
10 paper on the dipole microphone.

11 Q I'd like to show you very briefly Defendant's
12 Exhibit D and refer you to a sales flyer that has been
13 mentioned before behind the tab PPI Sales Flyers, and it
14 pertains to the Plantronics MS-55 and MS-56, and I wonder
15 if you could just state very briefly what those units are?

16 A 55 is a headband supported headset with circumaural
17 ear cushions on its earphones.

18 On one of these earphones is mounted a microphone
19 unit with a voice tube running down to the talker's
20 mouth to pick up the speech sounds. It has a single tube
21 and the difference in 56 is that there are two tubes
22 in the manner of Olney and they are running parallel to each
23 other to the earphone unit -- the microphone unit mounted
24 on the ear unit.

25 Q Is this a circumaural rather than an earcap headset?

2 A Yes, these are circumaural ear cushions.

3 Q Going back to Defendant's Exhibit C, would you
4 turn to 2-A and first indicate whether you are related
5 to the Daniel W. Martin whose name appears as the inventor
6 in this patent?

7 A I am he.

8 Q Would you briefly describe what this patent shows?

9 A This patent shows a magnetic armature-type of
10 transducer used in sound powered telephones chiefly
11 at that time. The receptor unit has a type of earcap which
12 is molded rubber and extending from this, the central portion
13 of this earcap is another molded attachment which extends
14 at an angle with the axis of the transducer towards the
15 outer end of the auditory canal.

16 The acoustical tube is the -- the acoustical tube
17 19 is the means for transmitting the speech sound from
18 the diaphragm 5 through holes in the brass cover to the
19 auditory canal.

20 The purpose of the patent was not to patent
21 an acoustical tube which I considered old at the time
22 but to obtain patent coverage for the combination of an
23 acoustical seal by the ear cushion against the ear and the
24 acoustical seal between the flanges 37 of the molded
25 earpiece and the periphery of the entrance to the auditory

2 canal.

3 Q Is the tube that shown in Fig.3?

4 A Beg pardon?

5 Q Is the tube what is shown in Fig. 3?

6 A Yes. The mechanical design of the tube. It
7 happens to be a telescoping type because detailed measurement
8 of the distance between the plane of the wearer's head
9 and the end of his auditory canal was found to be highly
10 variable among different people, so to accommodate this
11 range, we provided an acoustical tube of variable length
12 so that we could obtain rather dependably an acoustical
13 seal at both locations.

14 Q Was this tube that you referred to fixed in the
15 headset or was it removable?

16 A If you look closely at Figure 1, you will see that
17 there is an internally threaded insert at 21 that is a portion
18 of the ear cushion and there is a mating externally threaded
19 piece that is part of the lower section of the tube.

20 Q Is that shown in Fig. 3 toward the bottom?

21 A Yes, it is.

22 Q So in other words, you could screw this tube in
23 or out?

24 A Yes, it could be used or not used, depending upon
25 what the ambient noise conditions were. Although this had

two advantages. One is the noise reduction and the other is that it did reduce the volume into which the earphone was speaking and it had some sensitivity advantage for that reason.

Q Where did the sound pass?

A Passed from the diaphragm through the holes in the brass cover through the acoustical tube to the auditory canal.

Q And the outer portion of the cap was -- closed out the outside noise, is that it?

A Yes, it closed out some of it and then the tip closed out some more.

Q Were any of these earcaps ever sold?

A Yes. The Bureau of Ships of the Navy purchased about 50,000 of these in one contract.

Q Do you know whether they were used with the tips in or out?

A Both ways. They were shipped with the tips.

Q Noting that Olney characterizes his headset as having an earcap 1-A, would the earcap which your patent indicates is an improved earcap, would that be interchangeable with the earcap in your opinion of the Olney Patent?

A If suitable design changes, mechanical design changes were made so that one would fit the other, it

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would be acoustically usable and an advantage.

Q Would this be a routine matter ---

A It would be a matter of routine mechanical design.

1 Q Would you turn to Tab 2B and again just briefly
2 state what is shown in the Gilbert patent that is shown
3 there?
4

5 A This headset has its two transducers mounted
6 in casings at the end of the headband and the sides of these
7 casings typically rest against the sides of the head of the
8 wearer and acoustical tubes 31 and 41 transmit the sound
9 from the transducers to their tips, 36 and 42, which typ-
10 ically rest at the outer end of the auditory canals.

11 Q Is there any adjustment so it could be moved at
12 different spots on the head?

13 A Yes. The pivot 30 that is shown in Fig. 2
14 provides angular adjustment which will allow not only angular
15 change, but you can translate this into distance change,
16 depending upon where you wear the headband.

17 Q Would you next turn to the green tab which
18 follows immediately the Gilbert patent? And just state what
19 that shows.

20 A This is an advertising sheet for the Telex
21 Twinset which is of construction quite similar to the
22 patent that I was just speaking about, although it does have
23 an adjustable tone arm to allow the length of the acoustical
24 tube to be varied in addition to the angle.

25 Q I note that this flyer, which characterizes this

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as a Twinset, is an entirely new way to hear with a headset. You forget you are wearing it. Never before such comfort, lightness, all day long ease of use.

Could this hearing piece be used in place of the earcap in either the single tube version or the double tube version of the Olney headset?

A With suitable routine mechanical redesign so that the parts would fit, yes.

Q Was that true prior to 1961?

A Yes.

Q Again turn to the next green tab which at the bottom of the page shows another view of the Telex Twinset and indicate what is shown at the top of that same page.

A At the top of the page is shown a boom mike headset which is a Twinset that has mounted upon it a microphone at the end of a boom.

Q Is there an indication there of what the weight of the headset is?

A The document reports that it is three and a half ounces.

Q Would you turn to the next tab, which is Tab 2C. Just state what the document is that is behind Tab 2C

A This is a report and a suggestive type of recommendation issued by a committee of air personnel

1 zb-3
2 concerning light weight headsets and boom microphones.

3 Q Would you turn to Page 8 which in this book
4 is the last page of that report and indicate what that shows?

5 A Well, I have read the document and this shows
6 a possible arrangement that they have shown and the arrange-
7 ment consists of a headset with two alternatives. In both
8 cases there is an adjustable dynamic differential or a noise
9 canceling type of microphone on a boom. The boom is pivoted
10 from one of the earphone casings and the type of ear cushion
11 shown here is the conventional flat faced type that goes
12 against the ear. The alternative that is shown is to use an
13 earphone with acoustical tubes such as shown in the
14 Telex Twinset.

15 Q Were these known alternatives at the date of this
16 report in March of 1957?

17 A They were known alternatives before the date
18 of this report. It may have been creative from the stand-
19 point of these people, but in the electro-acoustical field,
20 they were previously known.

21 Q What people are you referring to, Dr. Martin?

22 A The airlines people who may not have been so
23 familiar with the art as if they were working in the field
24 of acoustics.

25 Q You are referring to the people who wrote the

1 zb-4

Martin-direct

2 ARINC report?

3 A Right.

4 Q Would this Page 8 indicate anything in 1957.
5 as to a man skilled in the art, as to the interchangeability
6 of an earpad for an ear tube in connection with the
7 Olney headset?

8 A Well, this report was prepared by users rather
9 than creators of headsets. So it would mean to me that the
10 alternatives were well-known to those who were not highly
11 skilled in the art.

12 Q Well, I am thinking about if a man who is an
13 ordinary routine engineer had the Olney patent which has
14 the earcap and this Page 8 which shows what you have already
15 explained, would it indicate to him that he could use either
16 the earcap or this other alternative in the Olney headset?

17 A Yes.

18 Q Would you turn to the next tabe, which is Tab 3.
19 This is an article in the Post Office Electrical Engineers
20 Journal by Spencer and Robertson. Would you explain what
21 this article shows?

22 A This article is a technical description of a head
23 set developed for use in Great Britain and in their telephone
24 system. The headset as shown in Fig. 2 has a combination
25 housing enclosing an earphone and a microphone unit worn

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1 on one side of the head and supported by a head band. The
2 sound is picked up near the wearer's mouth by the horn
3 which is colored green here as an acoustical tube and
4 transmitted through the tubing to the microphone unit.
5

6 Q Do you know whether this device can be worn on
7 either side of the head?

8 A It was designed so that it could be because of
9 the pivoting of the horn.

10 Q Do you know whether it uses miniature microphone
11 and a miniature receiver?

12 A Well, miniature is a relative term, but the
13 total weight of the entire headset was five ounces or less,
14 it says.

15 Q Does the author characterize the transmitter and
16 receiver as being miniature?

17 A Yes. On Page 78, the first column, the last
18 paragraph. He refers to the transmitter in particular
19 as a miniature carbon granule sealed capsule.

20 Q On Page 179, in the left-hand column toward the
21 bottom --

22 A The receiver is a miniature version of the rocking
23 armature receiver.

24 Q Would you look further up in that same column
25 on Page 179 where there is some discussion of frequencies,

zb-6

Martin-direct

and explain what that has reference to? And I am referring to the portion that is colored yellow..

A Well, it is possible to design things in a complementary way when you are trying to achieve a given type of frequency response and this yellow-colored portion shows that the authors have designed their horn so that its cutoff frequency is complementary to the response of the transmitter unit, giving an adequate uniformity of response up to 4000 Hertz.

Q Just one other question on Page 178, in the right-hand column there is a discussion under the heading "The new headset," and I wonder if you would just state briefly what that indicates?

A Well, it says that this is a serviceable unit. stand mechanical shocks and this is done by the use of nylon and other resilient plastics.

Q No, I am afraid you had the wrong page. 177 is the right-hand column.

THE COURT: I thought you want 180 on the right-hand column.

MR. BRADLEY: Did I say 180, your Honor?

THE COURT: No, you said 177. I think you mean 180.

MR. BRADLEY: I want him to indicate --

1 zb-7

Martin-direct

2 THE COURT: The portion on 180 also begins
3 the new headset, and so forth.

4 Go ahead.

5 A This passage relates that the concentration of
6 transmitter weight at the end of the boom on boom type
7 headsets presents a mechanical or dynamic problem and that this
8 new headset is a solution to that problem because the
9 center of gravity of the transmitting portion is moved over
10 toward the side of the head.

11 Q Does it indicate that they made use trials with
12 the device designed initially as a boom mike?

13 A Yes. He is referring to the trial that they
14 made that way. This was preliminary to their design. They
15 made trials, user trials, as telephone companies do.

16 MR. ARNOLD: I am afraid I haven't been following
17 quite correctly, your Honor. It appears to me we are now
18 about to address ourselves to trials reported here. Where-
19 as this publication teaches whatever it teaches, the trials,
20 of course, are hearsay. We have no opportunity to examine
21 the people that made the trials to find out what they did,
22 so to the extent that the paper speaks hearsay, we, of course,
23 object to it.

24 THE COURT: He can tell us about what the
25 paper says, but he can't tell us about the user trials

1 zb-8

Martin-direct

2 reported.

3 MR. BRADLEY: Yes, your Honor.

4 I am not relying on it for the trials, but merely
5 that they are reported here.

6 THE COURT: Have you finished with this piece of
7 prior art?

8 MR. BRADLEY: Yes, this article.

9 THE COURT: All right, let's take our afternoon
10 break.

11 (Recess.)

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d 4B

BY MR. BRADLEY:

Q Dr. Martin, you have just discussed the Spencer-Roberton.. article which shows a horn and one of the documents we introduced was Defendant's Exhibit E, which speaks of an acoustical horn or horn as being a tube of varying cross-section. I wonder if you are in accord with that definition?

A Yes, I am.

Q Is that a generally-accepted definition in the trade?

A Yes, it is.

Q Were you involved in the development of these acoustical terminology definitions?

A I was chairman of one of the subcommittees that produced the original standard on acoustical terminology, not the original one, but one of which this is a slight variation.

Q In other words, this one we have is Defendant's Exhibit E. It is approved 1960. Is that the one you are referring to?

A I believe it was generated from the one produced in 1951.

Q There is one other point in here which you mention and it deals with the term "Acoustic" or "Acoustical."

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1 That is on Page 9, definition 1.3. Maybe you could
2 just indicate what that specifies and explain what it is.
3

4 A I don't want to belabor this particular point,
5 but the thing that I said previously about acoustic and
6 acoustical is in agreement with this definition, but within
7 the Acoustical Society and among acoustical engineers the
8 term "acoustical" is also used frequently where the standard
9 says that the proper one would be "acoustic" when referring
10 to the wave.

11 Q You mean the terms are used interchangeably?

12 A They are used almost interchangeably but cer-
13 tainly when you are speaking of a property of the sound,
14 you would be more likely to say "acoustic," than "acoustical,
15 but they are used so interchangeably that I wouldn't quibble
16 about the point at all.

17 Q I neglected to ask you one point about the Telex
18 flyer that is behind Tab 2B, and particularly the flyer that
19 shows the boom mike. You note in the column there there
20 is reference to double receivers -- I should say headset with
21 double receivers or headset with single receiver. What does
22 that have reference to?

23 A Although you have a headband you can support
24 a single receiver unit on a headband just as you can support
25 two units, one on each side, and both possibilities are

gwb-3 Martin-direct

available for sale in this instance.

Q Would you turn back to Tab. 3 and we will continue where we left off.

We had just spoken about the Spencer-Roberton publication.

Do you know whether that is a publication in this country or a foreign publication?

A It is a foreign publication, but it is available in libraries in this country.

5A

1 5b pm qwrfl Martin-direct

2 Q The Post Office in England is basically the
3 Telephone Company, is that correct?

4 A Yes.

5 Q Would you turn to the next green tab which shows
6 British Patent 770,896, and just briefly state what that
7 shows?

8 A This shows a single earphone mounted on a headband
9 and within the same case is the microphone unit and this
10 appears to correspond rather closely with the headset
11 microphone that we were just looking at in the article by
12 Spencer and Robertson.

13 Q It is essentially the same headset, is that
14 correct?

15 A Right.

16 Q Would you look at page 3, the left-
17 hand column toward the bottom where I colored that yellow.
18 Just indicate for the record what that states.

19 A Well, it says that the set constructed as described
20 weighs only four ounces, and it also points out that the
21 exponential horn is made of nylon and that the horn and
22 the microphone are designed to complement each other from
23 a frequency response standpoint.

24 Q Turn to the next green tab --

25 THE COURT: Let me ask you this:

Does the horn exhibit resonance characteristics?

1 gwrf 2

Martin-direct

2 THE WITNESS: Yes, sir.

3 Q What is the purpose of the tapered cross-section
4 of the horn?

5 A The purpose is to make the collection of sound
6 energy more efficient. A horn is like an electrical
7 transformer and the ratio between its mouth area and its
8 throat area gives you an indication of how efficient
9 it is going to be.

10 Q Turning to the next green tab, as I have indicated,
11 British Patent 716,801, and this is also a patent to
12 Robertson and some others, although it says Robertson.

13 Would you just say briefly what is shown in
14 that patent?

15 A This is similar to the other one except the tubular
16 portion is cylindrical for a much higher percentage of
17 the total length. In fact, the mouthpiece is a sort
18 of a flare at the end of a cylindrical tube. This one also
19 shows a way to make it easily deformable into a curve
20 which is something like a gooseneck lamp.

21 Q I want you to call out the dimensions of the tube
22 in this case and on page 3, the left-hand column, I note
23 about line 23 it states that the diameter of the bore of
24 the segment at the narrowest point is .187

25 inches, which I believe is 3/16 of an inch?

2 A Yes.

3 Q How does that compare in general terms with the
4 dimensions specified in the Olney Patent for the voice
5 tube?

6 A Same order of magnitude.

7 Q Would you look at the bottom of that same page
8 where it is colored yellow and just explain briefly what
9 you understand that to mean?

10 A Well, this part of the provisional specification
11 points out that you could use an acoustic tube not only
12 for the microphone but it would also be possible to use
13 it for a receiver over at about line 114, I believe, or 113
14 in the second column of the provisional specification
15 and flexible ducts can be used in both cases.

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2 Q Just one other part on page 2, on the right-hand
3 column, starting at line 85, where it is colored there.
4 Again, just briefly state what is indicated there?

5 A It is indicated that even with a miniature microphone
6 mounted on an adjustable boom, there is some problem to
7 keeping the adjustment proper when the head is moved due to
8 the rotational inertia of the microphone upon the boom.

9 Q What do they suggest to do about it, if anything?

10 A They propose to put the microphone where it can
11 be supported on the head harness and use a flexible duct
12 between the microphone and the mouth.

13 Q Is that an acoustical tube?

14 A Yes, it is.

15 Q And going back in time to the date that this
16 was published in 1954, if someone had the, for example,
17 Telex boom mike headset with one or two ear tubes and also
18 had this patent in front of them which contains the part
19 you just discussed, would this provide a solution as to
20 how to avoid the problem of having a boom mike move or fail
21 to move and the head move?

22 A It would certainly suggest putting the microphone
23 near the Telex earphone transducer and running a tube
24 down, yes.

25 Q Would that be understood by someone of ordinary

2 skill or would it take more than that?

3 A I think of ordinary skill in the electro-acoustic
4 field.

5 Q Would you turn to Tab 4 -- I'm sorry. Before we do
6 that I would like you to -- I would like to hand you
7 Defendant's Exhibit F which contains some brochures of
8 either Standard Telephone & Cables or of the British Post
9 Office and I would like you to just state not in any parti-
10 culars at all but just in general terms what is shown in
11 this exhibit?

12 A Well, among the pictures in these sheets are a
13 number of pictures of the headset of the Roberton type as
14 sold and produced in Great Britain.

15 Q Do you see any dates as to these flyers? I think
16 they are in order of time, so -- I believe the first one has
17 a date on the bottom of it.

18 A Do I have the right book here?

19 Q Yes.

20 A All right. August of '63 is the date that is
21 shown.

22 THE COURT: What are you looking at now?

23 MR. BRADLEY: Just the dates on these flyers.

24 THE COURT: In what --

25 MR. BRADLEY Defendant's Exhibit F, your Honor.

1 lzrf 3

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2 THE COURT: Exhibit F.

3 Q Do you see any date on the most recent one in that
4 book?

5 A I see another one in February of '66 and then
6 farther back August 1973.

7 Q Do you know of your own personal knowledge whether
8 this headset is still in use by the British Post Office?

9 A I do not have personal knowledge of that.

10 Q We have already discussed the Dreher Patent, which
11 is behind Tab 4, but I would like to refer you just briefly
12 to a document, Defendant's Exhibit X, and they include
13 Exhibits from X-1 to X-5.

14 The first of these is a letter from plaintiff's
15 president, Mr. Schiavoni of AT&T. It is dated March 2, 1966.
16 And the others which are X2 to X5 are attachments I to IV of
17 that letter.

18 A '67.

19 Q Did I say --

20 A '67.

21 Q I am sorry, March 2, 1967. I refer you specifically
22 to Defendant's Exhibit X-5 and to pages 9 to 10 which per-
23 tained to a molded earpiece self-supporting headset. That's
24 the title on page 9. Do you see that, Dr. Martin?

25 A Yes.

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Martin-direct

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Q Immediately after page 10 there is two pages that have photographs showing the MS-51 ear mold supported headset. Do you see those also?

A Yes.

Q Going back to page 9 in about the middle of the first column, there is a statement that a molded earpiece shaped to each individual user's ear was used to support this device as well as providing an acoustic transfer tube for reception.

Do you agree with that description of the MS-51?

A Yes, I do.

Q I should ask you, you are not familiar with the MS-51 personally, is that correct?

A That's right. I am acquainted with some of the other products of that company but I am not familiar with this one.

Q And so your answer is -- have you reviewed these documents that you are looking at now?

A Yes, I have read them thoroughly.

Q And your answer is based upon that review?

A Yes, it is.

Q Looking at X-4, it is a paper which -- the entire paper appears to be a description of the MS-51 and in this case the last two pages have photographs showing the headset

1 lzrf 5

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2 which is an ear mold mounted headset: do you see those
3 photographs?

4 A Yes.

5 Q Lower on the first page under the II there is a
6 statement, "A description of the headset follows. The housing
7 containing the microphone and receiver transducer snaps
8 into the ear mold. Sound from the receiver transducer is
9 conducted to the ear through the tube-channel in the ear
10 mold. "

11 Do you agree with that description?

12 A Yes.

13 Q And lastly I refer you to the Exhibit X-1, which
14 is the letter to Mr. Schiavoni, and page 3 particularly.
15 I note for the record that page 3 is dated February 28,
16 1967, whereas the first two pages are dated March 2, 1967,
17 but I think that probably indicates just some of the pages
18 were retyped.

19 Going back to apge 3, just before the last para-
20 graph, there is a reference to the MS-50 and to
21 attachment 4 and it indicates here, "Ear mold constitutes
22 tube to ear connection."

23 Do you agree with that description of the device?

24 A Yes.

25 Q Would you turn now to Tab 4-A of Defendant's

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1 Exhibit C and particularly to Fig. 1 which is on page 3.
2 This is an article in 1958 by Mr. Lybarger. Do you know
3 Mr. Lybarger?
4

5 A Yes, I know him very well. He is president of
6 the Radio Ear Company that makes hearing aids and has been
7 very active in acoustical standards work in the hearing aid
8 field.

9 Q Is he well known in the field?

10 A Yes.

11 Q I note that in the Fig. 3 there appears to be a
12 cross sectional view --

13 THE COURT: I think you mean Fig. 1 on page 3.

14 MR. BRADLEY: Yes, your Honor.

15 Q In Fig. 1 there appears to be a cross sectional
16 view of an ear mold supporting a receiver and there
17 is a designation of the passage through that ear mold
18 as being tube M2R2. Are you in agreement with that
19 terminology, with that description of the passage?

20 A Yes, that is concerning the first portion of the
21 tube.

22 Q The first portion in which direction?

23 A To the left, adjacent to receiver.
24
25

2 Q You were looking at what, M1 --

3 A Excuse me, I thought you said M1R1. It is the
4 right portion entering the ear canal that is M2R2.

5 Q Is that standard terminology in the field as far
6 as you know?

7 A Yes.

8 Q Would you turn to Page 8 --

9 THE COURT: Let me ask you this. What is
10 the purpose of the Vent M4R4?

11 THE WITNESS: That is for pressure equalization.
12 In many cases it isn't needed because it doesn't fit so
13 well, but if it fits very well, then if you are riding around
14 in an aircraft and go up and down in altitude, this
15 allows the d. c. pressure to be equalized between the inside
16 and the outside.

17 Q Would you turn to Page 8, please. Just the bot-
18 tom of the page, there is a listing of numbers. Would
19 you just indicate what they represent?

20 A Well, in this table the first item is the length
21 of the accoustical tube in the standard coupler which Dr.
22 Romanow design, .710 inches and a diameter of .120
23 inches. The other numbers indicate typical lengths of
24 the corresponding acoustical tube in individually molded
25 earpieces.

zb-2

Martin-direct

Q Would they vary from one person to another?

A Yes. Some people have a longer ear canal than others and they vary in almost all dimensions. Some become quite constricted.

Q Do you know whether the ear canal itself is known as a resonant tube?

A Yes. I consider the ear canal a resonant tube and Dr. Beranek's book, "Acoustical Measurements," refers to it as a resonant tube.

THE COURT: At what frequency in the average person?

THE WITNESS: Well, you mean at what resonance frequency?

THE COURT: Yes.

THE WITNESS: Approximately 3500 Hertz for a quarter wave resonance.

Q What is the approximate length of the ear canal?

A Approximately an inch. It varies greatly from one person to another. I believe Fletcher's book on speech and hearing says it is an inch approximately.

Q So the variation going back to Page 8 in this table would vary from about, in terms of the passage through the ear mold, from about a half inch to about seven-eighths in the ones listed here, is that correct?

A Yes. The seven-eighths being for someone with

1 zb-3
2 a longer ear canal than average.

3 Q Would you turn to the next tab, which is
4 Tab 4B. I would just like to look at Fig. 1 in this
5 Henderson patent and ask you whether -- well, why don't you
6 just state what is shown in Fig. 1.

7 A Fig. 1 shows an ear mold which contains only
8 the outer portion of the usual ear mold so it fits more uni-
9 versally than it would if it went farther in and in
10 place of the missing portion is an acoustical tube rigidly
11 fastened to the molded part and with a soft, compliant
12 rubber tip that extends the tube onto the auditory canal.

13 Q Does this ear mold, therefor, have an acoustical
14 tube?

15 A Yes.

16 Q Do you know whether this ear mold would be
17 replaceable as an alternate for the ear mold of the Dreher
18 patent?

19 A Yes. That ear mold could be used and the micro-
20 phone hole would be expected to be produced in the molded
21 portion, wouldn't have to be but probably would be for space
22 reasons.

23 Q In other words, are they alternates -- the Hender-
24 son one and the Dreher ear mold?

25 A From an acoustical standpoint, yes.

1 zb-4

Martin-direct

2 Q I was referring to in terms of their usage in
3 the headset of the Dreher patent.

4 A They could be used in the same place. The only
5 reason I made a distinction is mechanically they are
6 a little different, but they would serve the same function.

7 Q Would you turn to the next tabe which is Tab 4C
8 and please state first what the document is that is here?

9 A This is a report published by Air Force Cambridge
10 Research Center and written by the group at Ohio State
11 University who were working on speech communication devices
12 during this particular time, which was the middle of the
13 fifties, and Moser and Dreher are the authors of this
14 report.

15 Q Do you know whether that is the same Dreher as
16 in the Dreher patent?

17 A That is the same man.

18 Q Would you turn to Page 1 of the text and just
19 refer to the yellow-colored section and indicate what this
20 discloses?

21 A This discloses an experimental headset microphone
22 combination which the Ohio State Scientists made a trip
23 to investigate at Palm Beach Air Force Base. It describes
24 in the bottom paragraph what this experimental system
25 consisted of.

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Q Can you state what that is?

A Well, the operational personnel in the Air Force who put this together assembled a group of items that were readily available to them, including a TelexTwinset for listening and a M32 microphone, which was on the oxygen mask counterpart of the M33 that we had here a little while ago. It is a very similar unit except it is used inside of an oxygen mask and the two parts have short acoustical tubes instead of long acoustical tubes, so it is a noise canceling microphone within a mask and they have modified the microphone to provide several feet of plastic tubing to go to these holes that lead to the short acoustical tubes.

Now we have the M32 with two long acoustical tubes, in fact even longer than most of the ones we have been speaking about. And because they didn't have a convenient way of mounting this microphone on the headset, but wanting to get it away from in front of the mouth, they clipped it onto the shirt, I believe it says. This was intended, no doubt, to illustrate a point. It was just something improvised in the field.

THE COURT: Did you say what the diameter of those acoustical tubes is?

THE WITNESS: Where is it, sir?

THE COURT: Does this article that you have been

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referring to state at any place what the diameter of the
acoustical tubes is?

THE WITNESS: I don't believe so. It gives
weights for the transducers but -- and for the headset --
no, that weight is the standard H78 headset microphone that
is given there.

THE COURT: It seems to me, although I don't
anticipate what might be ahead of us in this volume of prior
art, that Tab 4B, which was the Henderson patent, shows
lengthy acoustical tubes of quite small diameter which are
flexible and which are used to interconnect a receiver to the
auditory canal. But I don't see anywhere else a tube of
such length and such small diameter being used for conducting
the speech from the mouth of the operator to a microphone
and the question is this. These microphones generate very
low signal levels, do they not?

THE WITNESS: Microphones are relatively in-
efficient compared to loudspeakers.

ad 6B

THE COURT: As I recall, minus 35DB output for a microphone is somewhere in the ballpark for a dynamic microphone, minus 40 DB, something like that?

THE WITNESS: Yes. Part of this is because the speech sounds reaching the microphone are not very powerful.

THE COURT: Now, by contrast, even a miniature receiver can put out a watt or more of audio power which is tens of thousands of times the audio power that is generated by a microphone, isn't that correct?

THE WITNESS: That is correct, because you have a much smaller power going into the microphone than you have coming out, and if you had the same transducers they could be equally efficient, but with an amplifier you would be putting more power into the transducer and therefore getting more power out.

THE COURT: Isn't it possible that before the Larkin invention people thought it practical to use these small diameter tubes of considerable length for the purpose of conveying the much greater power you get in a receiver to the auditory canal, but wouldn't have thought it practical to use similar tubes, that is, similar in terms of diameter and length, for conveying the pressure waves from the mouth to the transmitter?

THE COURT: But the M33 has apparently larger passageways than we are talking about here, that is, 15, 25 thousandths diameter, doesn't it?

THE WITNESS: Well, I don't know the exact diameter of the tube on the MS50, but I would estimate that it is something of the order of 60 or 80 thousandths, the inside diameter, and the tubing in the M33 is, in its dimensions, while it is somewhat rectangular in shape, these dimensions are certainly not a different order of magnitude. They are larger. I think in the Olney they were in the same general size range, and I would point out that in the broadcast microphone field back in the thirties or early forties, at least, directional microphones of the so-called shotgun type were built with much longer tubes than these where they used a whole group of tubes of varying lengths in order to obtain a sharp directional pattern with all these tubes feeding into the same microphone unit.

THE COURT: And what diameter tubes?

THE WITNESS: I don't recall exactly. I would think something of the order of an eighth of an inch.

THE COURT: All of these prior devices, and this is true of that -- is the M33 you referred to?

1 THE WITNESS: Yes, sir.

2
3 THE COURT: Had not only a somewhat larger
4 tube, but they also had a large intake orifice whereas the
5 patented device and the accused device have an intake orifice
6 that is nothing other than the end of the tube, in other
7 words, you have a tube of 15 or 25 thousandths diameter which
8 is just cut off and which in terms of the angle subtended
9 couldn't possibly pick up more than one-tenth or one-one
10 hundredth of one per cent of the total energy coming out of
11 the mouth and then when that is further attenuated by being
12 passed through that narrow tube of some four and a half
13 inches in length and which you said, I think, gave a 10 db
14 attenuation as a typical matter, it seems to me that people
15 before 1961 might well have assumed that you wouldn't end up
16 with enough power or enough pressure, whichever way you want
17 to view it, at the microphone to come out with a signal
18 to noise ratio that would give you acceptable intelligibility

19 THE WITNESS: I have several things to respond
20 to. Could I have the M33 microphone?

21 (Handed to the witness.)

22 A The 10 decibel figure I gave was for a longer
23 tube and one of smaller diameter than this. I was referring
24 to measurements that I made back in '43 or '44, some five
25 or six years before this was being developed on our Navy

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Martin-direct

project. This was for the Air Force.

The orifice you are looking at here with the wind screen is larger than the orifice that is inside. That is just a hole in the tubing on the inside and the microphone will work just as well without this piece on it except for wind noise and, in fact, on the MS50 an extension was provided for operational use that I think we have seen pictures of which extended the tube from the corner of the mouth over in front of the mouth, and it had a larger area on that little cup than there is here on the M33.

THE COURT: May I see it?

THE WITNESS: Yes (handing).

THE COURT: Well, they tell you here to talk with your lips touching the microphone.

THE WITNESS: I will explain that.

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Martin-direct

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2 THE COURT: And the orifice on the side that
3 faces the microphone actually consists of four slots, each
4 of which looks like it might be better than one hundred
5 thousandths in width and maybe three hundred thousandths
6 in length, so that the angle subtended is a very substan-
7 tial fraction of the total area in front of the mouth?

8 THE WITNESS: Let's consider the Olney patent
9 which was a predecessor of this in our minds at the time we
10 designed this. The tubing on that patent was of a
11 diameter small in the range we are talking about and it
12 would have worked just as well as the version with the wind
13 screen on the end. I can see why this might present a
14 question to you, but there is no doubt in my mind that if
15 we made this tubing one-fifth the cross-sectional area
16 that it is in here that we would have a microphone that
17 would be entirely workable in the system.

18 THE COURT: I don't doubt it now because it's
19 been proven, but the question is whether or not people
20 would have realized that in 1961.

21 THE WITNESS: We would have. I would like to
22 explain one other thing that you commented on, talk with
23 lips touching microphone.

24 This microphone was developed for a system in
25 which it was required that the speech intelligibility be

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2 over 80 per cent in a noise level of 120 decibels and various
3 noise types were specified. At the time that the contract
4 started, they thought that jet aircraft were going to be a
5 lot noisier than they turned out to be because of the
6 acoustical treatment in the planes, and we were required to
7 do something that no one else had ever done: produce a
8 system which would give outstanding intelligibility under
9 extremely adverse acoustical environment. That's why it
10 says that on there.

11 You said something about signal-to-noise ratio
12 I believe, at the end of your question. This microphone
13 was used with a pre-amplifier that had automatic gain
14 control in it so that a weak talker or a loud talker would
15 still put out about the same electrical signal, audio
16 signal, even though the sound pressure would differ.

17 I think that even if the microphone -- well,
18 I am sure that even if this microphone had put out 8 or 10
19 decibels less than its typical audio output level, the
20 signal that the amplifier would have sent to the headset
21 would have been the same within a db or two.

22 Now, you are correct that if the weaker speech
23 is used it would make a disadvantageous signal-to-noise
24 ratio, but it would not be the fault of the microphone.
25 My point is the microphone could have been much less efficient

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Martin-direct

2 electrically. The important thing is the signal-to-noise
3 ratio out here. The limitation has never been the signal-
4 to-noise ratio in the electrical part of the system.

5 THE COURT: We know that now, but the question
6 really has to do with whether or not people seeing these
7 various prior patents and publications which showed long,
8 small diameter tubes for connecting receivers to auditory
9 canals would have said, "Aha, I can use the same tube for
10 connecting from a point adjacent the mouth to a microphone,"
11 because there are different problems involved. We are
12 talking about devices which have to operate at much, much
13 lower output than receivers normally operate at a ratio
14 of 10,000 or more to 1.

15 THE WITNESS: Well, my first experience with
16 voice tubes was when I was working in the sound powered
17 system field where the microphone and earphone units are
18 working at essentially the same level because there is
19 amplifier, and while I rejected the use of acoustical
20 tubes in this case because of an approximately ten decibel
21 reduction, it was because it was a sound powered system and
22 cannot have an amplifier that I didn't use it. If it had
23 been a system using an amplifier I probably would have
24 gone in that direction.

25 THE COURT: Go ahead. Excuse me.

2 BY MR. BRADLEY:

3 Q Dr. Martin, you mentioned the dimensions of the
4 tube in the Olney patent and I wonder if you could call
5 those out. It is behind tab 2 in column 4. At line 9, I
6 believe, or line 8 it refers to one model.

7 A The diameter is 9/64 of an inch. Is that what
8 you are referring to?

9 Q Yes. That is the inside diameter?

10 A Yes.

11 Q And in the case of Olney where he uses a single
12 tube version, does he use anything at the end of the tube
13 or is the tube just open?

14 A Well, there is a piece there that -- well, in
15 figure 23 it is just open and it certainly could be used
16 that way.

17 Q I am referring to the single tube headset version.

18 A The single tube version as shown in figure 28, I
19 believe, is one without any fitting on the end, but the
20 reason for the fitting on the end in the Olney patent is
21 to define more clearly that you are supposed to be speaking
22 into one of these and not into the other. It is separating
23 the ends by a greater distance.

24 Q What about this column 10 where he is referring
25 specifically to the headset version with a single tube?

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2 A Well, it says that the retained tube would not
3 require having the fitting on the end. It obviously
4 wouldn't be required because there is no problem in getting
5 the ends of the two tubes separated so there is only one.

6 Q Mouthpiece 17 would be eliminated?

7 A Yes, that is what it says, and I would agree.

8 Q Do you have any idea as to how the dimensions of
9 the tubes in Olney which you just discussed relate to the
10 dimensions of the tubes that are shown in Henderson behind
11 tab 4B?

12 A No. They are somewhat longer than the tubes in
13 M-33, but there is a wide variety of lengths here in
14 Henderson.

Q I'm thinking of the cross sectional dimension or internal diameter.

A Well, I can only judge by the scale of the drawing of the drawings on the front of the patent and these indicate that these tubes are of a size generally used in the hearing aid field.

Q And how would that relate to the tubes in the Olney headset, do you have any idea?

A Let's see, it said nine-sixty fourths, was it?

Q Yes.

A That's not very different from the size tubing that is typically used in the hearing aid field.

Q Going back to the --

THE COURT: Olney says nine-sixty fourths?

THE WITNESS: Yes.

Q It was at column 4, line 9.

MR. BRADLEY: It was at column 4, line 9, your Honor.

THE COURT: Yes, I see it. Fine, thank you.

Q Going back, I think you covered the Dreher paper somewhat but does this indicate that there are two tubes going from the microphone down to the M -- from the mouth, the pickup down to the M-32 mike, or is it just a single tube used in connection with that mike?

1 lzrf 2 Martin-direct

2 A I can't say because it says tubing. Knowing that
3 the M-32 has two short acoustic tubes, I am assuming
4 that it was a double tube, but I really don't know.

5 Q You mentioned this has a Telex Twinset, which is
6 the No. 3776, binaural headset, is that correct?

7 A Yes.

8 Q What did it have in terms of the microphone piece,
9 how would it be, for example, compared to what is in the
10 Dreher Patent itself? The Dreher Patent being Tab 4.

11 A It refers to a small plastic circular container of
12 approximately 13 cubic centimeters capacity that is a
13 sort of a mouthpiece at the lips and it is attached to
14 a curved six inch section of hollow aluminum tubing which
15 starts the voice sound on its way down the tube.

16 Q And it is picked up from that six inch hollow tubing
17 by the plastic tubing?

18 A That is my understanding of it.

19 Q Why is the microphone clipped to the shirt instead
20 of being up on the head, do you have any idea?

21 A It was a mockup, an experiment, and I think the
22 people who were doing it probably didn't know much about --

23 MR. ARNOLD: I object, your Honor, to what he
24 thinks the people who were doing it were trying to do.

25 THE COURT: Sustained.

Q Would it be a routine matter in your opinion at this time to have replaced this microphone by a miniature microphone?

A Yes, this microphone actually is fairly small but it is not as small as the state of the art provides today. If you are looking for small size.

Q Would you turn to the following page, the portion colored in yellow, and state what that indicates?

A Well, the purpose of the staff study by Ohio State was to see if they could use available miniaturized microphones to get a similar system to the experimental one.

Q Would it be necessary to mount it on the shirt if they had a miniature microphone?

A There would be no reason to do so.

Q Would you turn to Tab 5 -- let me just indicate that the following green tab just shows U.S. Government research reports which provides the date of publication of the Moser and Dreher article.

Now would you turn to Tab 5 and indicate what that discloses?

A This discloses a behind-the-ear hearing aid with sound passing through an acoustical tube from the receiver unit over-the-ear and into the ear canal through the portion of the tube that is marked or colored blue.

2 It also shows a microphone unit inside -- that's
3 No. 39 -- and there is a shorter acoustical tube leading
4 from that microphone -- that is No. 38 which is
5 colored green -- leading to the exterior of the unit, and
6 I believe in the text it is pointed out that this could,
7 of course, be extended on out into the air for some distance
8 to get even closer to one of the most important sources
9 of sound that a person has who is hard of hearing, namely, his
10 own voice.

11 Q Would you look at Fig. 3 for a second. The horn
12 or support portion over the ear there is a unitary piece, is
13 it not?

14 A Yes.

15 Q And then subsequently in Fig. 4 that same piece is
16 split into two pieces that look like 40 and 33, is that
17 correct?

18 A Yes.

19 Q And I direct your attention to a column 3, line
20 12. There is one sentence there that mentions the part 40
21 and I think that is what you had reference to.

22 Would you read that sentence and state specifically
23 what it indicates?

24 A "Part 40 can also be constructed as a tube which
25 is screw connected with the connecting tube 27, it

being of course assumed that appropriate threads are provided for this purpose."

Q So instead of having the part 40 you can have a short tube there, is that correct?

A Yes.

Q Dr. Martin, I hand you a copy of Plaintiff's Exhibit 29, which is the curve from the Beranek book that has been discussed. Are you familiar with the Beranek text?

A Yes.

Q Could you state whether the Beranek chart, which is shown in Plaintiff's Exhibit 29, is representative of voice tubes used in headsets in the 1961 period or before and also whether these would discourage one skilled in the art from using a voice tube with a microphone and a headset in your opinion?

A This curve is for a combination of a probe tube and a condenser microphone of very high quality and a coupling space between the two.

My point is that the curve does not -- it shows the attenuation in decibels for this combination, not for the tube alone, and the amount of attenuation that you would get at higher frequency would depend upon how the tube is terminated, a point which has been made earlier

2 in this case.

3 I think that anyone working in this field as a
4 developer or designer would not expect to suffer as much
5 attenuation as shown here and would realize it would depend
6 somewhat upon how large a diameter as well as length you
7 would use.

8 This tubing, of course, as it says right on the graph
9 is for .025 inches. So this is smaller in diameter and
10 therefore represents a greater attenuation at the high
11 frequencies than one would expect whatever type of microphone
12 you put on the other end.

13 Q What steps would you take to change the shape
14 of the curve if you wanted a different response
15 at higher frequencies?

16 A Well, you would use a larger diameter, as most
17 people in this field have done in connection with voice tubes
18 and ear tubes.

19 THE COURT: What is the diameter of the voice tube
20 in the R-70, do you know?

21 THE WITNESS: I don't know.
22
23
24
25

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2 THE COURT: Do you know the diameter of the voice
3 tube in the StarSet?

4 THE WITNESS: No. I am not familiar with the
5 dimensions of the tubes in either of these.

6 MR. ARNOLD: I believe the StarSet, your Honor
7 is 50 thousandths.

8 THE WITNESS: Another factor that should be
9 emphasized here is that having a rolling off on the high end
10 of the frequency range is well-complemented by the rising
11 frequency response trend of most magnetic microphone units
12 or any microphone unit that is resonating at its -- at a
13 high frequency. And this was recognized quite early, we
14 recognized it in the design of the M33. So that you have
15 one curve rising and the other rolling off and this gives
16 you a region in which the response curve trend is rather
17 uniform.

18 THE COURT: What about the presence of the reso-
19 nance peaks in Beranek's curve, are they beneficial or detri-
20 mental?

21 THE WITNESS: They are detrimental to the purpose
22 of Beranek and people who used this for measuring purposes.

23 THE COURT: I understand that, but in the
24 environment that we are talking about here, the voice tube
25 in a lightweight headset, are those resonance peaks detri-

1 zb-2 Martin-direct

2 mental, beneficial or negligible?

3 THE WITNESS: In general for speech purposes, peak
4 of this magnitude would be negligible. It is possible
5 that if you happen to have a transducer that had a hole in
6 its frequency response at a particular frequency, you might
7 take advantage of this peak so that the tube would smooth
8 the curve out somewhat. But as I look at the response curves
9 of the various microphones that have been equipped with
10 voice tubes, it seems to me that this has not been used
11 particularly and it would be fortuitous to have one that would
12 just happen to occur, a coincidence of the dip in one and
13 the peak in the other.

14 THE COURT: Am I incorrect in believing that
15 resonance peaks in an area where the response curve is falling
16 off might actually be beneficial because they would tend to
17 raise the average level of the response curve in that
18 area?

19 THE WITNESS: They would and in the case of sound-
20 powered systems where every decibel you can get helps, you
21 purposely design complimentary resonances. You put the
22 resonance different from your transmitter than you do
23 for your receiver. You put an electrical resonance at
24 some other place and use these various peaks together.

25 Outside of the sound-powered telephone field,

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I don't think quite so much attention has been given to using the sharp resonance peaks to advantage and the tendency has been more to trying to get smooth response rather than highly variable response.

Q Dr. Martin, I have some curves for the R70 and R71 and it might be helpful to just indicate, since this point has come up, what these curves show. These are Defendant's Exhibit XX1 and 2.

MR. ARNOLD: I wasn't following you. Could I ask you to repeat that, please.

MR. BRADLEY: I just handed the witness some curves for the R70 and R71 and asked him if he would just explain what they show, it being Defendant's Exhibits XX1 and 2.

A I will take the curves --

MR. ARNOLD: Just a minute.

I am advised, your Honor, that Mr. Mol ran the curves and if Mr. Mol is called to authenticate them at a subsequent time, we will proceed now without objection to this question on the guarantee that Mr. Mol will authenticate them.

MR. BRADLEY: He will authenticate them. The only correction I should make is they were actually first run by someone else and Mr. Mol went down and had the tests

1 zb-4 Martin-direct

2 rerun in his presence so he can authenticate.

3 A I will take the curves in reverse numerical
4 order. No.5 happens to be a curve for the microphone unit
5 without any tube or any additional damping. And when the
6 voice tube is put on, there are two curves for that condi-
7 tion. One with the voice tube fully extended with the
8 filter on it which provides -- excuse me, 3 and 4 are with-
9 out acoustical damping filter.

10 THE COURT: What is the filter and where is it
11 located?

12 THE WITNESS: You can see it, I believe, can't you,
13 on the unit?

14 THE COURT: Nobody has ever pointed it out to
15 me that I can recall.

16 MR. BRADLEY: I believe it is a little --

17 THE WITNESS: This little springlike thing at the
18 end with a filter inside. I believe it is a sintered
19 piece.

20 MR. BRADLEY: It is a little sintered disk, your
21 Honor, right inside the tip. It is very difficult to see the
22 disk through the screen.

23 THE COURT: What is the purpose of that?.

24 THE WITNESS: The purpose of that is to get you
25 from Curves 3 and 4 down to Curves land 2. 1 and 2

1 because of the little filter at the end, have more acoustical
2 damping and are therefore smoother and do not exhibit the
3 large excursions in response that are shown in Figs. 3 and
4 4 due to the resonance of the tube.

5
6 THE COURT: All right.

7 Q While you are discussing these curves, you might
8 indicate just what the difference is shown in the response,
9 let's say for example, taking the R70 first on XX1, between
10 the fully extended position of the tube at its full length
11 and the fully-contracted position of the tube.

12 A In the fully-contracted position the first
13 resonance frequency on the R70 is about 375 or 380 Hertz.
14 And in the fully-extended version, it is about 325 Hertz.

15 Q You are referring to the curves before the
16 damping is added?

17 A That's right. After the damping is added you
18 can't see what the effect is because that peak has been ironed
19 out completely.

20 Q Is there substantially very little effect in the
21 change of length once the damping has been added?

22 A There is very little effect due to the change in
23 length after the damping has been added and in fact the
24 resonance has almost completely disappeared.

25 THE COURT: Mr. Bradley, is this a good place to

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2 stop for the evening?

3 MR. BRADLEY: Yes, your Honor. I am only concerned
4 about your schedule as far as --

5 THE COURT: Well, if you think we are going to
6 have some question about finishing by four o'clock tomorrow,
7 I am willing to go on for a while if that is agreeable to
8 all counsel.

9 MR. ARNOLD: We are happy to proceed and I do
10 become a bit concerned about finishing. I don't know
11 what else you have but --

12 MR. BRADLEY: Maybe I would like to finish up
13 with the witness today if we can.

14 THE COURT: All right. Go ahead. If there were
15 a way to get out of that Philadelphia appearance gracefully,
16 I would welcome it, but I am afraid it might leave them
17 with a rather short program if I don't appear. Maybe
18 a better program.

19 Q Dr. Martin, I hand you copy of Defendant's
20 Exhibit H and also I place the original of that document
21 in front of you for your reference and I ask you if you would
22 indicate what that document is?

23 A This is a final report on a Government contract
24 initiated and administered at Wright Air Development Center,
25 Dayton, Ohio, in which the contractor, the prime contractor

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1 zb-7 Martin-direct
2 was a small firm, Western Electro Acoustic Laboratory in
3 Los Angeles. This was a study contract given to Western
4 Electro Acoustic in which it was understood from the beginning
5 that consultants would be brought in from numerous places
6 to discuss and analyze the state of the art and to make
7 suggestions for possible improvement in the performance,
8 efficiency and size and utility of headsets and associated
9 equipment in the Air Force.

10 And these various consultants would be sub-
11 contractors to the primary contractor.

k 8B

Q Would you turn to the foldout chart in Defendant's

Exhibit H and state what that shows?

A Is that Table II?

Q Yes. But before you proceed, I would like to

make one comment. In the depositions taken in this suit, it

was indicated that the bottom numbers are correct for the

chart and not the top numbers. For example, one of the

tables says Table III at the top and Table II at the bottom

and the other one is the reverse. To avoid confusion, I

ask you to draw a line through the table number at the

top of each chart so we will refer only to the table numbers

at the bottom.

MR. ARNOLD: Am I correct, Mr. Bradley, as I think

I am, Plaintiff's Exhibit 27A is the same chart?

MR. BRADLEY: I believe so. I believe you have

used the numbers that were used during the deposition.

MR. ARNOLD: I think that is correct.

Q Would you take now the chart that is designated

Table II and explain what that has reference to?

A Well, at the beginning of the contract we came

together -- I was one of the people involved in this, just

one of them. Other people were from various places.

For example, we had Dr. Fletcher, who had been director

of research at Bell Labs, and Bill Snow, who had retired

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2 from Bell Labs and was very knowledgeable in electroacoustic.
3 In fact, Mr. Snow was working as a direct consultant for
4 Veneklasen, who was the president of Western Electric
5 Acoustic. And we had people from various contractors and
6 from university laboratories. We got our heads together for
7 a brainstorming session and we tried to think of every way
8 that had been used or might be used to advantage for getting
9 the speech signals from a talker and for delivering speech
10 signals to a listener, and this table was the result of
11 about two days of brainstorming along this line by the
12 people I mentioned.

13 The upper part shows what we came up with. Now,
14 this was refined somewhat before it was brought out and I
15 think it was Bill Snow who did the refining job.

16 In the case of speech projection from man, which
17 is the upper part, we have listed in the center column
18 coupling means to source. The left side is just the type
19 of transducer that might be used. The right side is what
20 might be done to exclude noise at the talking end of the
21 system.

22 But concentrating on the center column, we see
23 14 different things that were listed and the order in which
24 they are listed represents the most common approach at the
25 top and the most esoteric thing that was thought of, perhaps,

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2 at the very bottom, starting with just picking up the
3 sound through the air with the transducer external to the
4 lips, the conventional way, and the second item was to use
5 a probe tube to an air microphone.

6 The reason the distinction is made here is else-
7 where we talk about vibration speech from the anatomy.
8 The throat contact, the next one, on which I did considerable
9 work and published, is a vibration pickup of sound trans-
10 mitted from the oral cavity through the walls of the throat,
11 not from the larynx directly, as is often mistakenly
12 believed.

13 Going on down, the tooth-contact microphone was
14 one considered of such interest that Mr. Veneklasen in
15 his laboratory actually did development work on this contract.
16 Picking up the air from inside the mouth was a natural
17 thing to do there. In fact, the tooth-contact microphone,
18 if it were an air microphone instead of a vibration pickup,
19 would do that.

20 Then number eight, for example, is the ear
21 probe tube which is the thing mentioned in the Dreher
22 patent which I had independently discovered myself at RCA
23 previously and during this project is when I found out from
24 Bill Snow that Bell Laboratories naturally had discovered
25 it before I did back in the thirties.

1 I can go through the rest of them if you like.
2 In the interest of time, I suggest that some of these
3 others -- I will just mention one more, if I may, number
4 eleven.

5 Air coupling to head is a project which we
6 accepted some responsibility for and issued a report on.
7 In fact, we got a patent on this which we have never used
8 in which an enclosure like an ear cushion is put on the
9 head and it has inside of it a gradient microphone, a
10 noise-cancelling microphone. The sound comes through the
11 skull, a little enclosure, which communicates with one side
12 of this two-tube microphone and not to the other but both
13 tubes receive noise through the enclosure wall from the
14 outside. So it cancels noise coming through this solid
15 thing. This was one of our contributions to this particular
16 project, and, as you see, it is pretty far down the list,
17 number eleven.

18 Q You mentioned that it goes from the most common
19 to the most esoteric. Is that continuous throughout, that
20 each one would be more common?

21 A Yes, something might bump up and down plus or
22 minus one position, but this was our judgment of the proper
23 order at that time.

24

25

App. 699

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2 Q And what about on the receive side in the column
3 below that?

4 A Because we were dealing with two types of speech
5 reception in the Air Force intercommunication system, namely,
6 headset for one and loudspeaker for another, because
7 loudspeakers were being used in the transport military
8 aircraft, we divided this into two parts and the first five
9 have to do with earphone type of listening and the last
10 five are in the loudspeaker category and we did the same
11 sort of thing within those two subdivisions, going from
12 direct air cavity to ear, probe tube to ear, air cavity
13 to head surface, liquid coupling to head surface -- this
14 would be to get the sound in by vibrating the side of the
15 head through a liquid medium -- and mechanical coupling to
16 the head surface, which is the bone conduction you hear
17 about in hearing aids.

18 You might say why was that one number five rather
19 than number three. Because it was widely used and is still
20 used somewhat today. It was because the power requirements
21 to get enough sound level in the hearing mechanism of the
22 person by this method did not present a very good outlook.
23 That is why we put it number five.

24 Q Do I understand that the upper portion in this
25 reception column, the upper five, would be recommended for

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2 headsets and that some or all of those at the top columns
3 at the speech end would be recommended for headsets?

4 A For microphones, yes.

5 Q And where would you classify the probe tube, then,
6 in terms of the most or least common?

7 A It was second most common in both categories.

8 Q There is one portion of this report which plain-
9 tiff has introduced as Plaintiff's Exhibit 28 and it contains
10 a table called Table I on page 1-12, and I wonder if you
11 would indicate what that shows?

12 A This is a recommendation for future research and
13 development and it shows some of the things that were
14 recommended for speech projection, for its reception and
15 for special helmet design.

16 Q What was the basis for those recommendations?

17 A The various opinions collected by Western
18 Electric Acoustic from the consultants during the course of
19 the project. We stayed in close communication through
20 reports from Western Electric Acoustic and visits from
21 them and we all got together at the end of the project and
22 went over the whole thing in preparing for the report.

23 Q Were the recommendations made on the basis or
24 made for products that required additional research or those
25 that had been fully researched?

App. 701

1 3GW

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2 A These were ones that we thought would require
3 additional research, not to say that they hadn't been given
4 a feasibility study of some type, but additional research
5 and development was being recommended for these approaches.

6 Q Was the recommendation upon the promising nature
7 of these or upon the fact they might warrant further
8 research? That is the point.

9 A I would consider there was sufficient promise
10 to go ahead and even though they were unusual they would
11 probably fit into the overall hardware program of the Air
12 Force or could be fit into it.

13 Q Dr.-Martin, do you have experience in the hearing
14 aid field?

15 A I have had intermittent experience in this field.
16 It has not been a continuous thing.

17 Q Would you just state briefly what it's been?

18 A It started in 1941 when I was first at RCA
19 and they sent me to obtain two individually molded earpieces
20 from the Western Electric local distributor because we
21 wanted to compare the performance of Western Electric hearing
22 aid receivers with the performance of RCA monitoring
23 headsets for the film recording industry. In Hollywood there
24 was a fad there for a while of using hearing aid receivers
25 for monitoring in place of larger, more wide range headsets.

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2 Then at various times through my work I made
3 reference to hearing aid units and, in fact, the most com-
4 prehensive study that I made was in the middle sixties when
5 our company seriously considered the purchase of two different
6 hearing aid companies as subsidiaries, and in our laboratories
7 we were asked to make comparisons of the performance of
8 these hearing aids and about 15 types I believe were
9 involved in that study.

10 But intermediate times I was asked by the Air
11 Force to evaluate hearing aid type units because of
12 recurring interest in that possibility for military use.

13 Q I hand you a copy of Defendant's Exhibit K-1
14 and I would just like to ask you a very few questions on
15 this since you are here.

16 I refer you particularly to tab 1 which shows
17 a Flygstad patent of Telex Corporation. Would you just
18 briefly state what is shown in that patent?

19 A This a behind-the-ear hearing aid type case
20 no doubt at Telex since they were also in the hearing aid
21 business, and it has a tube over the top of the ear for
22 reception of sound from the transducer and a voice tube
23 colored in green, number 12, coming under the
24 ear to the fairly typical location for the microphone in
25 such hearing aids. It is a headset evolving by the

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Martin-direct

2 addition of a voice tube from a behind-the-ear hearing aid.

3 Q What is it about that that makes you feel it
4 started as a hearing aid?

5 A The fact that Telex was in the business and it
6 looks just the way I would expect it to look from the
7 appearance of the various behind-the-ear aids that I have at
8 my laboratory.

9 Q Would you just turn to tab 4 which shows the
10 Guttner patent which you have already discussed.

11 THE COURT: Which tab is that?

12 MR. BRADLEY: Tab 4, your Honor.

13 Q I note that the Flygstad patent was issued in
14 1966 and Guttner in 1965. With the Flygstad patent as a
15 behind-the-ear headset, would you know or would a person
16 of ordinary skill in the art know how to convert the Guttner
17 hearing aid to a headset?

18 A Yes. These two arts are very closely allied
19 and have resided or do reside in the same company in many
20 places. So I think it would be a very straightforward thing
21 to do.

22 THE COURT: Let me ask you this: Is Guttner prior
23 art with respect to Larkin?

24 MR. BRADLEY: It is by virtue of the filing date,
25 your Honor, yes.

THE COURT: For purposes of the Hutchings patent, Flygstad itself is prior art so you don't have to worry about modifying Guttner in the light of Flygstad.

MR. BRADLEY: Well, the one point the witness explained that the Guttner is it has a tube coming out over the ear rather than under the ear.

THE COURT: Well, so does Flygstad as far as the receive tube is concerned and that is the tube you are talking about in Guttner coming over the ear. I don't know why you have to modify Flygstad with Guttner at all.

MR. BRADLEY: Your Honor, in Guttner the two tubes come out over the ear. They are colored blue and green there.

THE COURT: Oh, I see what you are saying.

All right.

Q The one last point was with regard to Tab 7 in Figs. 1 and 2.

Would you just state what that shows? This is a German DAS-1,132,973.

A In this patent the ear tube is connected to the bottom of the behind the ear case and the receiver therein and the voice tube comes over the top of the ear down to a point which might be considered an ideal pickup point for sound, namely, near the end of the auditory canal, which means that the effects of the head and the external ear upon the

1 zb-2
2 sound picked up are essentially reproduced because you
3 put the pickup point at the same place as the ear would be
4 picking it up from.

5 Q And let me ask you the same question, whether
6 in view of the Flygstad patent which shows, I believe you
7 have indicated what started as a hearing aid converted to a
8 headset, one could take the hearing aid in the -- one
9 skilled in the art could take the hearing aid of the DAS
10 reference behind Tab 7 and convert that to a headset?

11 A Yes.

12 Q I am referring particularly to Figs. 1 and 2,
13 the other figures are a little different construction. Did
14 you understand my question that way?

15 MR. ARNOLD: I am losing you now.

16 MR. BRADLEY: I said I was referring to Figs. 1
17 and 2 of the DAS reference behind Tab 7 rather than the other
18 figures which show somewhat different construction.

19 A I was looking at Fig. 1 when I gave you my
20 answer.

21 Q In this event with the headset thus converted,
22 where would the voice tube be located?

23 A It would be passing across the top of the ear
24 and down in the direction toward the mouth.

25 Q Where would the ear tube be located?

1 A Below the ear lobe with the tube coming up
2
3 into the auditory canal.

4 Q Dr. Martin, do you have any financial interest
5 in this suit?

6 A No, I do not.

7 MR. BRADLEY: I have no further questions.

8 THE COURT: What is your pleasure, gentlemen?
9 Do you want to go ahead with your cross tonight for a while
10 or do you want to recess now until the morning?

11 MR. ARNOLD: I am happy to proceed or not,
12 Can you give us advice as to how much longer you would expect
13 to need tomorrow in addition to my cross of Dr. Martin.

14 MR. BRADLEY: I know Dr. Martin would like to
15 get away if he can.

16 MR. ARNOLD: I don't think there is a practical
17 way to get Dr. Martin away tonight unless we work rather
18 extensively, which I can do.

19 THE COURT: You have one more witness?

20 MR. BRADLEY: I have Mr. Mol and Mr. Hutchings.

21 THE COURT: How long do you expect the two of
22 them will take together?

23 MR. BRADLEY: I would think maybe -- we have
24 one other witness we are going to ask about the sales.
25 That is three. We would be finished by noon.

App. 707

1
2 MR. ARNOLD: My cross-examination on top of
3 that? I am asking, I am not telling you.

4 THE COURT: How long do you anticipate your cross-
5 examination of this witness will be?

6 MR. ARNOLD: 45 minutes.

7 THE COURT: We can start a little early in the
8 morning.

9 MR. ARNOLD: I think that would be quite helpful.

10 THE COURT: All right. Why don't we plan to start
11 at 9:30 in the morning.

12 MR. ARNOLD: All right.

13 MR. BRADLEY: Fine.

14 THE COURT: I am willing to go on for another 15
15 minutes if you want to tonight, but if you think we can
16 finish by starting at 9:30 tomorrow, that is agreeable. Let
17 me say this. We have a little safety valve in that we
18 can start early Friday morning before my pretrial conferences
19 start if we need to pick up another hour.

20 MR. ARNOLD: All right. We can work it any way
21 that suits your pleasure. I would just as soon go ahead
22 for another 15 minutes.

23 THE COURT: I am agreeable. I take it the
24 reporters don't mind as long as the meter is running.
25

zb-5

Martin-cross

CROSS-EXAMINATION

BY MR. ARNOLD:

Q Dr. Martin, at one time during your testimony you indicated a non-availability of the miniature components as of the time of the, your work on the M33. We have a stipulation in the case that components of this size were available at least five years prior to Larkin, so that it is clear, is it not, that the small components were available had anybody wanted to apply them to the M33, they could have done it at least a long time prior to Larkin?

A That's correct.

Q You have made reference, I believe, to an acoustic tube being known in such as the M33 of which thousands were sold, being known in publications about the M33, being known in the Olney patent and other such places. This particular example being the acoustic tube to the mouth.

Is it your testimony that the acoustic tube to the mouth as an idea was so well-known prior to 1960 that everybody that had anything to do with acoustics would inherently know about it, is that your testimony?

A Almost everyone. In fact I would think that almost anyone who had flown military aircraft in the sixties would have known about it if they had thought about what it was they were wearing on their head.

zb-6

Martin-cross

1 Q All right. Then do I translate that correctly
2
3 when I say the same thing is true of the acoustic tube
4 to the ear in accordance with your testimony, that you feel
5 that everybody that had anything to do with acoustics along
6 prior to 1960 would have known well about the acoustic
7 tube to the ear?

8 A I think the general public was aware of this be-
9 cause they saw the acoustic tubes to the ear.

10 Q In your testimony at the beginning of your
11 testimony you made reference to a closed tubular member that
12 gave resonances at one quarter wave length along the length
13 of the tube. Did I state that correctly or have I misstated
14 you?

15 A I was mentioning the quarter wave resonance
16 that occurs as the lowest frequency resonance of a tube
17 closed at one end.

18 Q This is totally closed at one end, not with an
19 ordinary medium or impedance microphone at one end, is that
20 correct?

21 A Yes.

22 Q So that insofar as you were speaking of these
23 resonances that were one-quarter wavelength by contrast
24 with Mr. Romanow's testimony about half wave lengths, that
25 was a theoretical thing that does not obtain in the real

1 zb-7

Martin-cross

2 world we are talking about where we have microphones on the
3 end of the tube, is that correct?

4 A Are you asking if the quarter wave resonance
5 phenomenon is not in the real world?

6 Q I know that it is in the real world of a totally
7 closed tube, but my question is addressed to things like in
8 the Beranek curve, he was using a WE640 and the book says,
9 microphone. and he got this degradation and he got the re-
10 sonance at the half wave rather than the quarter wave posi-
11 tion.

12 My understanding would be that you are not saying
13 that Mr. Beranek falsified his curve?

14 A No, sir.

15 Q What was it that got this degradation, then,
16 Item 1 and 2, got the half wave rather than the quarter
17 wave resonances that you referred to earlier?

18 A You mentioned two things. You said degradation
19 and by that I assume you mean the attenuation of the tube?

20 Q I should have used attenuation.

21 A In the case of the probe tube for measurement
22 purposes, you are trying to get some attenuation because you
23 don't want to interfere with what it is that you are measur-
24 ing, so you use a very small diameter tube.

25 For a voice tube where you want to avoid having

App. 711

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zb-7a

Martin-cross

531a

large attenuation, but you don't want to go to something
as big as a three-inch piece of pipe, you compromise and
use a larger size tube which will give you less
attenuation.

End 10A

Q Well, I don't find --

2 THE COURT: He still hasn't understood your question.

3 He wants to know what was it that changed the
4 picture from the half wave resonance described by Beranek
5 to the quarter wave resonance you spoke about, and my
6 understanding is closing or effectively closing one end
7 of the tube?

8 THE WITNESS: That is right.

9 THE COURT: Does a high impedance microphone consti-
10 tute an effective closure of one end of the tube?

11 THE WITNESS: If you make it high enough in its
12 mechanical impedance, it will close the end of the tube.

13 THE COURT: The kind of transducer we are talking
14 about here, the kind used in the StarSet, does that have
15 a sufficiently high impedance to represent effective
16 closure of one end of the tube?

17 THE WITNESS: The way we got into this subject was
18 talking about data published by Plantronics on the MS-50
19 microphone which exhibited quarter wave resonances and I
20 think this shows that it is a very practical and real
21 world thing that we are talking about.

22 Q My main point in this subject matter was to
23 be sure that there was no technical difference of opinion
24 between you and Mr. Romanow as regards quarter wave
25 phenomena or half wave phenomena.

2 A None whatever. My only reference to this was
3 I had heard an explanation that from this you would
4 use this to say, how long a tube could be a tube and still
5 have its lowest frequency resonance within the speech
6 frequency range. And while I don't agree with the criterion
7 that you have to define a certain length, once one has been
8 defined, I am saying simply that if you happen to have a
9 quarter wave resonance series such as exists in the MS-50
10 as shown in the Plantronics data, this would extend that
11 same criterion down by a ration of 2 to 1, to three-quarters
12 of an inch instead of an inch and a half.

13 Q So if I understand your story, typically a
14 three-quarter of an inch tube of the 50 thousandths,
15 speaking in terms of what is the size that is used at least
16 in Plantronics' use, of the 50 thousandths diameter voice
17 tube, or acustic tube, whatever it is, a tubular member --
18 I am trying to avoid overcharacterization -- a tubular
19 member 50 thousandths of an inch in diameter and three-
20 quarters of an inch long would normally not display either
21 significant attenuations nor resonant erraticism in its
22 transmission characteristics when there was a microphone
23 or a transducer at the other end of it?

24 A Your first resonance in this case would be
25 at three to four thousand hertz. However, the audio

frequency range, even the speech frequency range goes somewhat higher than that. A good telephone system or a good intercommunication system will transmit and receive up to at least 6,000.

Q All that they told me when I studied how to make myself hear is if I can make you hear at 3,000 cycles, I have made you hear. Isn't that real?

A For normal ambient noise conditions this is true. When you are fighting the case of communication in high noise levels, as the French and Steinberg work of Bell Laboratories shows very clearly, you have to have a range from about 400 to about 6,000 or 6,500 hertz.

Q Do we actually have an effective range in the United States telephone company system that goes as high as 6,000 hertz?

A I don't believe we have that yet, but there are a lot of us still hoping it will get there.

Q All right. That is not one of the things that the Bell System now designs for?

A That's correct. And the S's and the F's would be much more easily distinguished if it went up a little bit higher.

Q Then thinking in terms of 3,000 cycles down to 200 cycles, we would think in terms of not getting a

1z 4

Martin - cross

significant amount of either attenuation or a significant amount of resonance erraticism in tubes that were as much as an inch or under, or have I strained it when I put it that way?

A Well, the ear canal itself, as I said earlier, resonates about 3,500 and its length is just a little bit longer than we are talking about right now, so I think the two things go hand in hand.

If you had a peak, a small peak at that particular frequency, something of the order of 6 decibels, you would be getting a resonance in that artificial tube that would be similar to the resonance frequency and effect that you would get in the ear canal itself. The open ear canal.

THE COURT: Is the ear canal considered an open end system or a closed end system? In other words, what is the effective acoustic impedance of the eardrum?

THE WITNESS: I don't recall that, but we have the hammer, anvil and stirrup little bony structure fastened to that eardrum and I would expect it to be a fairly high mechanical impedance but I can't speak with authority on that subject because I haven't measured the mechanical impedance of the eardrum.

THE COURT: You don't know whether it is a quarter wave system or a half wave resonance system?

2 THE WITNESS: I based my comment on data shown for
3 the resonance facts of the outer ear and looking at that
4 data, which is also in Beranek's book and is published
5 many places, there is a resonant peak of about that
6 magnitude, around 3,500 hertz.

7 Q Around 3,500 hertz, assuming the average ear
8 being one inch long, so that if we talked about tubes
9 that are one inch long and confined ourselves to 3,000
10 cycles, we would be at least pretty well off of the edge
11 of that peak resonance, is that correct?

12 A Yes.

13 Q Now I direct your attention to the Guttner
14 reference, which is behind Tab 4 of Defendant's Exhibit K,
15 among other places, and address your attention to the size of
16 the tube 27 in Figure 2 or the tube 38 in Figure 4, and
17 considering the proportions of the ear and the size of
18 that equipment, I'll ask you how long you think that tube
19 is?

20 A Nearly everyone seems to have a copy of this
21 except me.

22 Q I beg your pardon. Let me provide you with one.

23 A Are you referring to these two tubes?

24 Q No, the green tube, 38 in Figure 4, the green
25 tube 27 in Figure 2. Looking for the length of those tubes.

1
2 A What was the question? I was so concerned
3 about not having a copy of the picture.

4 Q I am trying to get your best estimate as to
5 what a man of ordinary skill in the art reading the
6 Guttner Patent will believe the length of those tubes to be?
7 It is the input tube 27 in Figure 2 and the input tube 38 in
8 Figure 4.

9 A In Figure 4 input tube 38, just roughly scaling
10 this schematic type of figure would be something of the
11 order of an inch or slightly less.

12 Q All right. The point then is that in the Guttner
13 reference you would not expect to have a significant amount
14 of either the attenuation or the resonance erraticism that
15 you will have in a long tube that reaches all the way to
16 the mouth, isn't that correct?

17 A The shorter and smaller tube will have less
18 resonance and more attenuation. Let's see, I said less
19 resonance and less attenuation.

20 Q And as a matter of fact, won't it be almost
21 de minimis if that tube is really only three quarters of an
22 inch long and is of 50 thousandths of an inch diameter,
23 won't that be an essentially de minimis vehicle performing
24 in effect like an orifice if it is of shall we say three-
25 quarters of an inch length and 50 thousandths inch diameter?

2 A You said like an orifice. An orifice is an
3 opening in a wall or something. And I think I have
4 agreed that this will exhibit very little resonance effect
5 in the most important part of the audio frequency range,
6 and that because of its length the attenuation will be
7 minimal.

8 Q Then it doesn't matter whether we call it an
9 acoustic tube or not. The use of this length tube in a
10 hearing aid does not suggest to any man skilled in the art
11 that there will be no attenuation in harmonics if we stretch
12 a tube all the way to the mouth. This doesn't teach that,
13 does it?

14 A I would have considered it superfluous if it
15 had taught this because it is well -- the properties of small
16 tubes from both a resonance and attenuation standpoint are
17 well known for many years.

18 Q And they were well known for many years prior to
19 1960?

20 A Yes.

21 Q The implications that I have derived from the
22 defendant when they have cited an over the ear three-
23 quarter of an inch to an inch, whatever it is, length tube,
24 they have suggested, as I have caught their implications
25 that that taught the idea that you could go all the way.

2 to the mouth with no difficulty and my point is those
3 skilled in the art knew that if they went all the way to
4 the mouth with that tube, they had to do something to meet
5 the kind of thing represented in Beranek's book, whatever
6 they had to do, they had to meet that in some manner,
7 didn't they?

8 A I don't think they were concerned about that. I
9 think this being a hearing aid, they were not -- they were
10 more concerned about cosmetic matters and the size or the
11 length. While I personally believe that it would be
12 desirable to have a voice tube on a hearing aid microphone
13 because it would allow a person who is hard of hearing to
14 hear himself quite well, as on the side tone of a telephone
15 handset, from a cosmetic standpoint it would probably be
16 disastrous. So I think that that is a matter of application
17 design.

18 Q You testified that Guttner --

19 THE COURT: I think we ought to take our adjournment
20 now. Maybe we will start again at 9:30 in the morning if
21 you still think we need that extra time.

22 MR. ARNOLD: I think we do, your Honor.

23 THE COURT: All right, 9:30 then.

24 (Adjourned to March 20, 1975, at 9:30 a.m.)
25

WITNESS INDEX

<u>Name</u>	<u>Direct</u>	<u>Cross</u>	<u>Redirect</u>	<u>Recross</u>
Hans Cornelius Mol (Resumed)	340	416		
Daniel William Martin (Resumed)	419	529		

EXHIBIT INDEX

<u>Plaintiff</u>	<u>Identification</u>	<u>In Evidence</u>
143,144		388

1 lzrf

541

2 Plantronics, Inc.

3 vs

4 Roanwell Corporation

New York, New York

6 March 20, 1975 - 9:30 a.m.

7 (Trial resumed.)

8 THE COURT: Good morning.

9 MR. ARNOLD: May it please the Court, overnight
10 we have found the missing exhibits from the deposition
11 and I would like to offer them and make comment about
12 them since the witness is no longer on the stand. I have
13 first the original Roanwell operating unit, R-70, with
14 the over-the-ear voice tube which was sent to Bell Labs
15 for testing in December of 1969 and since the photograph
16 was earlier marked as Exhibit 144, we have marked the unit
17 as 144-A and I would hand that to the Court along with the
18 ultimate R-70 in order that the Court may examine
19 the change in design between the first unit, which was
20 designed with knowledge of Plantronics advertising flyer
21 brochure and the second unit which was designed after
22 they had a laboratory analysis of our unit and had measured
23 dimensions and all that.

24 THE COURT: All right.

25 MR. BRADLEY: I might mention, your Honor, we expect

2 Mr. Mol to be back on the stand and if there are any
3 questions concerning these, they can be put to him at
4 that time.

5 THE COURT: All right.

6 MR. ARNOLD: This is the container for the 144-A.

7 Then we also have the 143-A which is the R-71
8 originally submitted to Bell Labs for consideration and I
9 will offer that to the clerk and ask that they be formally
10 received in evidence.

11 (Plaintiff's Exhibits 143-A and 144-A received
12 in evidence.)

13 MR. ARNOLD: Also we had yesterday a specimen
14 of the Venture I, which was not ours to leave with the Court
15 and we now have obtained one that we can leave with the
16 Court, and so we substitute the new Venture I for the
17 one that was presented yesterday and we put the same marking
18 on it.

19 This is the one as to which Mr. Foley testified
20 concerning the degree of similarity between this and the
21 design of the Hutchings design and which we offer for
22 purposes of illustrating that it is feasible for you
23 to shape the back the same way, which you could do with
24 the extra hump, to use the plastic tube instead of the
25 metal tube.

It is feasible to have an operating unit that does not infringe the utility patent that does infringe the design patent. Regardless of whether this one does, our point is that it is feasible to do so. That's Exhibit 141 that we will now ask be formally received in evidence.

THE COURT: All right.

MR. ARNOLD: Here is the envelope.

(Plaintiff's Exhibit 141-A received in evidence.)

MR. ARNOLD: Finally, as a housekeeping matter, your Honor, plaintiff and defendant have both proposed findings of fact which are now before the Court as an agreed finding P357B reciting plaintiff's belief -- well, what happened, the recitation here is that plaintiff Plantronics wrote a letter to their counsel to defendants reciting belief of prospective infringement of the Larkin Patent and this is a different issue from what I'm talking about before.

This was prospective infringement by an MS-50 type unit being designed by the defendant. In response Mr. Clark, counsel for defendant, wrote to plaintiff's counsel a letter reading, in part:

"It is our opinion that the claims therein defining a headset device are invalid."

1 And the way the proposed finding that has been
2
3 agreed to is worded, it is not clear whether that
4 opinion of Mr. Clark was an opinion to his own client
5 which, if that were in evidence would waive all attorney-
6 client privilege and we would be entitled to hear them
7 all, or rather was an advocate's letter back to
8 Plantronics' counsel and I wish to make it clear that that
9 letter was Mr. Clark's letter as an advocate for his client
10 back to plaintiff's counsel rather than an internal opinion.

11 And I think that should be clarified so that that
12 finding will be understood. Now I suppose we might resume
13 with the cross examination of Dr. Martin.

14 MR. BRADLEY: Counsel, while we are in
15 housekeeping matters I would like to introduce as defendant's
16 trial exhibits all of those contained on defendant's list of
17 trial exhibits which currently go from Defendant's Exhibit
18 A through Defendant's Exhibit AAA.

19 MR. JANICKE: We have no objection to most
20 of them, your Honor, but we do as to some. The first one
21 on the list has been disposed of by your ruling on the
22 motion to strike and that is Defendant's Exhibit II and all
23 of the subject documents, I think 1 through 17. Those
24 pertain to the S.G. Brown license which issue has been
25 stricken from the case.

1 1zrf 5

545

2 THE COURT: Do you withdraw those, Mr. Bradley,
3 in view of the Court's ruling?

4 MR. BRADLEY: Your Honor, I just want to get the
5 numbers.

6 Yes, the numbers now go up from II-1 to II-19.
7 There were two additional ones offered. Your Honor, we would
8 like to make a proffer of those.

9 THE COURT: All right. I don't mean to say that
10 you are precluded from arguing on appeal that I was wrong
11 in my ruling striking parts of the answer.

12 MR. BRADLEY: We respectfully disagree but we will
13 not argue that now. We would just like to make a proffer.

14 THE COURT: All right. But you do agree all of
15 them relate only to that S.G. Brown license?

16 MR. BRADLEY: Yes. That is coupled, your Honor,
17 with the foreign filing that we talked about because
18 they all relate to either the foreign filing or the foreign
19 licensing.
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THE COURT: I will sustain the objection to those exhibits for the reasons stated in my opinion.

MR. JANICKE: That was II-1 to II-19 are not received?

MR. BRADLEY: That is correct.

MR. JANICKE: Our next objection is to Exhibit JJ which is a portion of the Larkin deposition transcript from a breach of contract case in 1965, entitled "Bowman against Plantronics," and we object to that transcript on the ground of hearsay. Mr. Larkin was deposed at some length in the present case and of course we have no objection to that transcript, but the earlier case was on different issues and we have a hearsay objection on that ground.

MR. BRADLEY: Your Honor, I certainly contest that. Mr. Larkin's testimony in the last case in no way resembles his testimony in this case. Mr. Larkin's testimony in the last case was taken in November of 1965. He had been the president of the plaintiff until April 1965. At the time it was taken he was vice-chairman of the board on salary, and he was in charge of product development or something like that or consultant for product development.

As an officer of the company or a member of the board, in this Circuit his testimony is clearly admissible from another case irrespective of what the issues were or

1 zb-2

2 even if the statements were made otherwise than in another
3 case.

4 Secondly --

5 THE COURT: Well, they would clearly be admiss-
6 ible for purposes of cross-examining but to offer an entire
7 deposition is another matter and I am not so sure about that.

8 MR. BRADLEY: We are only offering portions
9 of it.

10 THE COURT: Even to offer portions of it in gross
11 without using them for purposes of cross-examining, I am
12 not at all sure about its admissibility. You say you
13 have cases in this Circuit? What are they?

14 MR. BRADLEY: Yes, I have.

15 Your Honor, if I might give you the cases after
16 the noon recess. I can pull them together.

17 THE COURT: All right. I will withhold ruling
18 on that.

19 MR. BRADLEY: There is a second aspect to this,
20 and that is in addition to this being an admission by a
21 party in prior litigation, it is also a statement against
22 interest of the party who is a patentee. He made indications
23 that -- concerning the operativeness, I should say non-
24 operativeness of the device in this patent. What is the
25 prior art. Whether he even conceived of the voice tube

1 zb-3

2 and various things like that which are -- aside from the
3 fact he is a party, statements against interest by himself,

4 Thirdly, the case law in this Circuit is quite
5 broad in terms of the doctrinal areas of same party same issue

6 The law here is more in the nature of the new
7 federal rules, the same motive in cross-examination and
8 under the cases in this Circuit I think that the issues
9 in that case would be sufficiently close to the issues in
10 this case to warrant them, even if he were not a party --

11 THE COURT: What were the issues in that case?

12 MR. BRADLEY: He had been hired in 1961 by
13 the Plane-Aids people, it became Plantronics, and initially
14 he did not have a contract with them and then subsequently
15 he had consulting or employment contract which is referred
16 to in different ways. According to that he was to get a
17 percentage of their income or profits --

18 MR. ARNOLD: I believe the record is confused.
19 You mean about Mr. Bowman, not Mr. Larkin.

20 MR. BRADLEY: Mr. Bowman who is a plaintiff in
21 the case, yes.

22 THE COURT: Is it Bowman's deposition you
23 are offering, not Larkin's?

24 MR. BRADLEY: I am sorry, your Honor, I did
25 confuse it. It was Larkin's deposition but it was in the

1 zb-4

2 case of Bowman versus PPI. Bowman was the man who was
3 the consultant in '61 with the contract I referred to and
4 in the suit he sued them on the contract. One of the things
5 he claimed was that he was the one that originated the voice
6 tube and various things of that nature.

7 THE COURT: This is what the plaintiff referred
8 to in its memorandum as a disgruntled former employee?

9 MR. ARNOLD: Yes, your Honor.

10 THE COURT: At the time he testified, he was no
11 longer an officer of PPI?

12 MR. BRADLEY: That is right, your Honor.

13 THE COURT: You don't have to give me any cases
14 on that. I can tell you right now that is not admissible.
15 He was an officer of PPI at the time he testified.

16 MR. JANICKE: The deponent's testimony being
17 offered is Mr. Larkin's.

18 THE COURT: I am sorry. Okay. It is Larkin's
19 testimony.

20 MR. BRADLEY: I think I confused it. But the
21 suit was Bowman vs. PPI, and the testimony is the patentee,
22 Larkin.

23 THE COURT: And Larkin said that he was not the
24 inventor of the voice tube?

25 MR. BRADLEY: He said at the time he made the

1 zb-5

2 headset, he believed that he was the first to develop
3 a voice tube to be used together with microphone in a
4 headset and he found out that this was wrong. He was not.
5 He made other admissions and I don't want to characterize
6 the testimony -- I am saying, your Honor, that there are
7 very definite statements against interest in his testimony.
8 I can see why plaintiff wouldn't want it in.

9 I think for that very reason it is admissible.

10 MR. JANICKE: I have no objection --

End 1B

1 THE COURT: You have no objection?

2
3 MR. JANICKE: I was going to say I have no
4 objection to your considering the Larkin statements, if
5 there be anything that is a prior inconsistent statement.
6 I don't object to the authenticity of the transcript in that
7 respect. But my objection is to the use of what may be
8 in that Bowman case for its truth in this case.

9 MR. BRADLEY: I want to make it perfectly
10 clear I am not offering it to impeach the witness, I am
11 offering it as substantive evidence in this case.

12 THE COURT: Give me your cases and I will consider
13 the matter.

14 MR. JANICKE: My next and last objection is to
15 Exhibit LL, pleadings from the case of Telex against Plan-
16 tronics.

17 That case, which Telex dismissed with prejudice
18 after a round of discovery, was a suit under the Flygstad
19 patent that has been discussed here. Telex brought
20 suit around 1971 or 1973 against Plantronics for infringement
21 of that patent.

22 After a round of discovery with apparently no
23 motions or recourse to the Court having been had, Telex
24 dismissed with prejudice. I don't know what relevance
25 pleadings setting forth positions of law at the initial

1 gwb-2

2 stages of that case could have to this case.

3 THE COURT: What is the relevance, Mr.
4 Bradley?

5 MR. BRADLEY: We also have cases on this. The
6 pleadings we are introducing are answers to interrogatories
7 by the then chief executive officer of Plantronics. We
8 have introduced the answer and the complaint so that things
9 are not taken out of context. But in the suit where they
10 sued on a behind-the-ear headset, the president of the
11 plaintiff indicated that there was no invention even back in
12 1963 to make that, he showed how the prior art was applied
13 combining a voice tube from one with a hearing aid to make
14 a headset and that would render the Flygstad patent invalid.

15 He also took the position that the MS43, which
16 they now question whether it is stable and so forth, was in
17 fact in public use in 1962 and for several years thereafter.

18 Your Honor, these are admissions by a party and
19 we have cases directly in point in this Circuit.

20 THE COURT: What do you say with respect to answers
21 to interrogatories by PPI in this case?

22 MR. JANICKE: The questions, the interrogatories
23 were calling for Plantronics' position in that case with
24 respect to the Flygstad patent.

25 THE COURT: These were not statements of fact

under oath?

MR. JANICKE: They were sworn to as interrogatory responses must be. But they refer to the MS43 headset as having been in public use, we agree, but the questions of advantages or disadvantages of the Flygstad vs. MS43 and what prior art may have applied to the Telex headset is in no way relevant to what prior art may apply to the Hutchings headset, which was in no way considered in that case.

We don't dispute that the MS43 was in public use. In fact, we rely upon it and have an agreed finding in this case that it was. It was one of the post-auricle headsets going the wrong way, the first one we know of, and we agree it was in public use.

MR. BRADLEY: Do you also agree it was in public use in 1962 and for several years thereafter?

MR. JANICKE: I am not certain about the several years thereafter after our investigation in this case, but, yes, in 1962.

MR. BRADLEY: If you agree to all of the statements that we want to use in this document, then I won't need the document.

MR. JANICKE: We have agreed in this case that the MS43 was in public use at that time.

1 gwb-4

2 THE COURT: What else did you want to use for
3 the answers to the interrogatories other than that fact
4 just stated?

5 MR. BRADLEY: Well, your Honor, I indicated
6 they took several positions. They listed patents that
7 they said had acoustical tubes and they have questioned
8 in this suit, because their position as to acoustical tubes
9 has gone all over the lot from one time to the next, so I am
10 not sure they are going to continue to question it.

11 At one time in the interrogatories they listed
12 such patents as Olney and others that had acoustical tubes.
13 They said in their answers under oath there are other such
14 things as whether or not it was an invention in '63 to
15 make a post-auricle headset, whether or not in 1963 it was
16 an invention to take a hearing aid and add a voice tube to
17 make a post-auricle headset.

18 I don't recall all of the parts to it, your
19 Honor.

20 End 2A

1 2b am gwrfl

2 THE COURT: It sounds to me that the Court should
3 have before those prior inconsistent statements of the
4 plaintiff. That isn't to say the plaintiff is estopped
5 from changing its position, but don't you think that is
6 something that is relevant to the Court's determination
7 Whether or not, for example, the Olney Patent has an acoustical
8 tube?

9 MR. JANICKE: Whether Olney has an acoustical
10 tube?

11 THE COURT: Yes.

12 MR. JANICKE: I certainly think that is
13 relevant to the Court's consideration in this case. I
14 wonder whether saying this and that does not amount to
15 invention as a matter of law in a pleading in another
16 case is relevant.

17 THE COURT: That is irrelevant, obviously, because
18 we have a different invention here than was involved in
19 the Telex case.

20 MR. JANICKE: That was the basis of my objection.

21 MR. BRADLEY: There are statements of fact
22 in there as to whether or not it amounted to invention in a
23 certain period of time to take a hearing aid and add
24 a voice tube to to it to make a headset. This is very
25 germane to this suit.

I can't imagine an argument that the plaintiff disclaims a statement it made under oath in another suit.

THE COURT: That is a different matter when you start talking about what is patentable invention or whether the invention patented in another case is patentable or was obvious at the time of its conception. But with respect to pure statements of fact as to what a particular piece of prior art shows, if that statement is inconsistent with a position taken in this case, I think the Court is entitled to know about it.

MR. JANICKE: My only basis was the one you just stated, your Honor.

THE COURT: I can assure you that with respect to any arguments about the law in that case, since there was a different patent involved and therefore a different issue of obviousness, I think that will have little or no affect on me and I will probably ignore those arguments or statements of position all along.

It is only the prior inconsistent statements of fact.

MR. JANICKE: I am not sure there are any and that is my difficulty. I wonder if we couldn't take the one item at a time.

THE COURT: If you want to, see if you can't

extract from the answers to interrogatories the statements of fact as distinguished from the positions of law.

MR. BRADLEY: Your Honor, we have already extracted from the interrogatories in that case, as was done in all our exhibits so as not to burden the Court, the ones we would like to offer.

THE COURT: That is not the point. Apparently you do have some arguments in there about what is obvious and what isn't obvious with respect to the Flygstad Patent.

MR. BRADLEY: We consider everything that is in there now to be statements of fact. Your Honor, I agree with you that whatever we introduce in this case you have to consider it and assess whatever weight you feel you should to it. There is no question about that. But we feel that as being offered the complaint and answer doesn't have to be included in that case, it is only to really make some of the answers understandable because some of the questions in the interrogatories say, "Name all of the patents that support what you said in paragraph 8 of the answer," or something like that. So to have the context you sort of need those.

THE COURT: Let me say this in order to shorten this up.

I will receive that exhibit -- what is the number

2 of it?

3 MR. BRADLEY: LL, your Honor.

4 THE COURT: I will receive Exhibit LL only to the
5 extent of prior inconsistent statements of fact.

6 MR. BRADLEY: Your Honor, I thought you indicated
7 only as to statements of fact. We are not offering it
8 just for inconsistent statements of fact for impeachment
9 purposes, we are offering it substantively.

10 THE COURT: All right, any statements of fact
11 that are relevant to the position taken by plaintiffs
12 in this case.

13 MR. BRADLEY: Fine.

14 MR. JANICKE: My final objection is a general
15 one that I worked out with Mr. Bradley, and that is that
16 the references introduced by defendant that I have not
17 indicated an objection to we want to reserve our objection
18 in the event that the defendant should attempt to use them
19 for a hearsay purpose such as recitation, historical reci-
20 tations, of what various things weighed, how people liked
21 them and so forth.

22 But absent an attempt to use it for that purpose,
23 we would have no further objections.

24 MR. BRADLEY: Your Honor, we agree to that. We
25 recognize that the statements, for example, one mentioned

1 user trials, it is pertinent, it mentions user trials.
2
3 Someone reading it might understand that is based on user
4 trials but it is not pertinent to whether or not there were
5 user trials and we don't intend to rely on any of them to
6 prove the accuracy of a statement such as that.

7 MR. JANICKE: And other statements similar to the
8 Telex unit weighing such and such, to the extent that
9 might be a prompting or teaching to someone in the art,
10 I don't have any objection, but we don't want to agree in
11 terms of marketplace reality on any of these weights unless
12 they are proved by other than hearsay.

13 MR. BRADLEY: We agree. It is only advertised as
14 weighing that amount.

15 MR. ARNOLD: Finally, we have had a lot of
16 reference to the Beranek textbook which we will refer to in
17 a moment. It strikes me, therefore, we should offer the
18 whole book in evidence. The copy that we have here is,
19 unfortunately, one that is scribbled up in the margins
20 and I think it would be improper. We will ask that the
21 Beranek textbook be received in evidence as Plaintiff's
22 Exhibit 145 and we will substitute a clean copy as soon
23 as we can buy one and replace it with the clerk, if there
24 is no objection.

25 MR. BRADLEY: No objection.
(Plaintiff's Exhibit 145 received in evidence.)

2 D A N I E L W I L L I A M M A R T I N ,

3 resumed the stand and testified further as

4 follows:

5 CROSS EXAMINATION

6 BY MR. ARNOLD:

7 Q Dr. Martin, since I have the Beranek book out
8 we might as well start there.

9 This morning before court convened, you were shown
10 page 833 -- it has been requested that I give further
11 identification of the Beranek book. The title of the book
12 is "Acoustic Measurements," published by Wiley, John Wiley
13 & Sons, Inc. and copyrighted in 1949. This is the same
14 Beranek book from which other exhibits have been taken by
15 defendant as well as by plaintiff.

16 You made reference yesterday to something which
17 I believe you called a shotgun microphone?

18 A Yes.

19 Q You said that the tubes in the shotgun microphone
20 were one-eighth of an inch? And I would like you to
21 address yourself to this picture and see if you can correct
22 that in any manner because Mr. Romanow worked on that parti-
23 cular thing and is aware of the error and if you would like
24 to correct your testimony I would be happy to have you do so.

25 A I believe the Court asked me if I knew of any

2 microphone that used long tubes and my response was that the
3 so-called shotgun microphone developed, I believe in the
4 late '30s at Bell Laboratories, was an example of a microphone
5 with long tubes.

6 This picture is not identified as a Western Electric
7 microphone, but that is immaterial because it is of the
8 general type I'm talking about.

9 When asked what the diameter of the tubes was, I
10 think I indicated that I was making only a rough estimate
11 based upon distant recollection and I said about an eighth
12 of an inch. I certainly wouldn't object to any higher
13 estimate which might be two or three times that much.

14 Q And if it is, in fact, more than three-eighths
15 of an inch, then that means that it is about seven and
16 a half times larger than the fifty thousandths of an inch
17 diameter of our headset tube, isn't that correct?

18 A Now that you mentioned those tubes, in view of
19 the fact that I was not aware of some of the tube diameters
20 that I was asked about yesterday, I wonder if I could
21 mention some data on tube diameters that I checked last
22 night.

23 Q Well, first I would like you to answer my
24 question. These tubes, according to Mr. Romanow, being a
25 project that he worked on, were in excess of three-eighths

2 of an inch and that would be also about seven and a half
3 times, roughly seven and a half times the fifty thousandths
4 diameter used in the mouth tube of our headset, is
5 that correct?

6 A I will answer the question in a moment. First
7 let me say that I know that Mr. Romanow knows what he is
8 talking about on this because while we may not always agree,
9 I know that one of his co-authors on one of his papers
10 was one of the co-authors of the paper on this particular
11 microphone, so I am sure he is very well acquainted with it.

12 THE COURT: Well, the answer to the question is
13 yes, three-eighths of an inch or .375 inches is seven and
14 a half times fifty thousandths of an inch?

15 THE WITNESS: That's the ratio between those
16 two numbers. I agree completely.

17 Q You were, however, trying to point out that there
18 was some error in the tubes that I was talking about or
19 something.

20 Would you go ahead and complete that explanation?

21 A Thank you. This came up primarily in connection
22 with the Olney Patent which clearly states that one of
23 their tubes had a diameter of nine-sixty fourths which works
24 out to about .140 inches. The tube that is currently
25 on the original model of the Larkin device measures .07.

2 The tube shown in the pictures of the early Larkin
3 device is obviously larger in diameter than this. At
4 least the external diameter is. I can't tell what the
5 internal diameter is but I would estimate from looking at
6 it that it is enough larger that the internal diameter would
7 logically be well over a tenth of an inch.

8 Q As a practical matter, there is no way for you to
9 tell what the wall thickness was of the tubes that he
10 was using at that time, isn't that correct?

11 A I can only estimate the external diameter and I
12 have already qualified my estimate, I believe.

13 MR. ARNOLD: I will address the Court's attention
14 to page 833 of the Beranek book where there is a photograph
15 of the shotgun microphone, and the witness, and ask you do
16 you feel that that microphone is going to be helpful
17 to anybody in designing what the Roanwell Laboratories
18 said of the plaintiff Larkin Patent was a combination
19 of user comfort, lightweight, high versatility and
20 adequate voice transmission, is that disclosure
21 going to have any relevance to designing a headset of this
22 type?

23 THE WITNESS: No, sir. This microphone was
24 mentioned only in response to the Court's question concerning
25 a microphone with a long tube.

2 Q I believe at the close of your testimony yesterday,
3 Dr. Martin, you testified to this effect

4 For a long period prior to 1960, acoustic engineers
5 knew that tubes of the order of magnitude of .05 diameter
6 had markedly different acoustic characteristics at fre-
7 quencies 3000 hertz and under, if they were shorter than
8 about three-fourths of an inch or an inch, on the one
9 hand, or longer than perhaps an inch or an inch and a
10 half on the other.

11 Did we ultimately reach agreement on that?

12 A I don't recall saying that. Were you quoting
13 my testimony?

14 Q No, I am trying to summarize what I thought was
15 about a half an hour's worth of repartee and be sure I had
16 gotten the gist of that in correct form.

17 A I am glad you asked that because I wouldn't
18 want this to be a summary of my testimony.

19 Q Directing attention to prior to 1960, directing
20 attention to the frequency spectrum less than 3000 cycles
21 or 3000 cycles, in the neighborhood of 3000 cycles and
22 less, which is the spectrum the telephone company devotes
23 its attention to transmitting, I believe it is 300 to
24 3000 is the primary design spectrum.

25 Directing attention to tubes of the rough size

of .05 inches diameter, my question then has to do with are there not substantially different attenuation and resonance characteristics as between tubes of the three-quarter of an inch, less than an inch I believe is one phrase you said, a little bit less than an inch length on the one hand, and tubes that are substantially longer, like an inch and a half and up on the other hand, is that not a fact?

A I have indicated that the attenuation of a tube is proportionate to its length and that the resonance frequencies are a function of the length.

This is part of physics and it is true.

The only reason that I mentioned yesterday something about tube length of the order of three-quarters of an inch to an inch is that Mr. Romanow has mentioned on a number of occasions, based upon an extrapolation of what is shown in the Beranek curve concerning tube attenuation, that with a half wave resonator such as exists in that curve, the lowest peak in the series, the lowest frequency peak would be up to about 38 or 3900 Hertz. I believe he said that.

My point was that in the plaintiff's microphones it is quite apparent from the data, from the Larkin article, that it was a quarter wave resonator rather than

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565a

2 a half wave resonator, and that this would make the one and
3 a half inch distinction which Mr. Romanow makes but which I
4 do not make, more logically three-quarters of an inch.

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2 Q All right. It seems to me that you having
3 given me what it is your desire to express that you have
4 in fact stated the same thing that it is my desire to get
5 expressed for the record, and still you leave the impression
6 that we are apart from each other.

7 Accept my parameters and see if we are not to-
8 gether because I am trying to avoid the semantic games as to
9 what you call the long tube or the short tube, and get to the
10 substantive reality as understood in 1960 and I am addressing
11 myself specifically to the frequency spectrum that is of
12 interest in Telephony, which is 300 to 3000 cycles because that
13 is all that is of interest to us in headsets.

14 And in the context of that frequency spectrum of
15 tubes on the order or .05 inches diameter, isn't it a fact
16 that there is a substantial difference in the attenuation and
17 resonance result from the short tube on the order of three-
18 quarters of an inch and a longer tube on the order of one and
19 a half inches up, isn't that exactly what you just told me?

20 A I believe it is. Whether it is the same as you
21 asked me in the first place, I didn't think it was quite
22 the same because I do not feel that either one and a half
23 inches or three-quarters of an inch is a borderline between
24 acoustic tubes and non-acoustic tubes.

25 Q Well, now you are back to the linguistics

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1 of what we call it. Whether we call it an acoustic tube
2 or a non-acoustic tube. I am trying to address myself
3 to whether we have acoustic attenuation and resonation
4 properties that were known to people in 1960 to be a bother,
5 to be something you had to design for, to be something you
6 had to give attention to. It was known in 1960 by
7 engineers in the art that when you went to the length, where
8 you had the resonation occurring, whatever that length was,
9 and we have defined it somewhere in the three-quarters to an
10 inch and a half length, when you went to that length you
11 then commenced to get an attenuation characteristic and
12 a resonance characteristic that you had to do something with
13 in the design of your equipment or else tolerate it?
14

15 A Some attenuation occurs even in the short tubes
16 but I certainly agree that the resonance part of it is cor-
17 rect. I will qualify it that way.

18 Q When you were using the three-quarter inch tube
19 you didn't have to worry about the attenuation in context
20 of any headset design?

21 A Not at .050 diameter.

22 Q I show you the Guttner reference about which you
23 testified yesterday and this language -- I think I have
24 quotes here as a matter of fact, -- maybe I should read the
25 context, though, so it will be fair to you. The top of

1 zb-3

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2 Page 506 you stated:

3 "It also shows a microphone." It is the Guttner
4 reference.

5 "It also shows a microphone unit inside -- that
6 is No. 39."

7 Do you find 39 there?

8 A Yes, sir.

9 Q "And there is a shorter acoustical tube leading
10 from that microphone" -- that is No. 38, which is colored
11 green -- "leading to the exterior of the unit," and I believe
12 in the text it is pointed out that this could, of course,
13 be extended on out into the air for some distance to get even
14 closer to one of the most important sources of sound that
15 a person has who is hard of hearing, namely, his own voice.

16 I coughed in the middle, my emphasis was wrong,
17 but could you understand what I was reading from?

18 A Yes.

19 Q My question is that you said something was pointed
20 out in the text there. Please show me where it was pointed
21 out in the text that you could extend that tube to get
22 even closer to one of the most important sources of sound that
23 a person has who is hard of hearing, namely, his own voice.

24 Where is that?

25 A I should have put some quotes in my statement,

1 zb-4

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2 because I added after the quotation an opinion of my own
3 concerning earphone headset design.

4 Q The person who is hard of hearing obviously
5 hears his own voice better than he does his partner's voice who
6 is speaking to him, does he not?

7 A Yes.

8 Q His difficulty of hearing, his hard of hearing
9 never keeps himself from hearing himself well enough to
10 understand what he is saying?

11 A I would simply point out the well-known cases
12 of people who have difficulty learning to speak because they
13 can't hear and for these people, hearing themselves over some
14 type of an aid is very important.

15 Q I will accept that receiver hearing losses with
16 small children, they have difficulty learning to speak. I
17 do not suppose it is a problem with generally severe hearing
18 losses but in all events it is a gross exaggeration in the
19 normal sense to say hearing aids are designed to enable the
20 speaker to hear his own voice so much as they are designed to
21 enable them to hear his partner's voice?

22 A Telephone handsets are designed with side tones
23 so that you can hear yourself, but it is true, it is at a
24 lower level, less gain than for distant sources.

25 Q You were a member, as I recall, of what was

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referred to as a panel of experts convened, I believe, by the Air Force. Have I stated that correctly or have I misstated?

A Yes.

Q And that panel of experts convened and had a brain storm session in 1956, that matured in a report, which is Defendant's Exhibit H, in 1959. February 1959 is the date of the report entitled "Study and investigation of specialized electro-acoustic transducers for voice communication in aircraft."

I would direct your attention to the objective of that program recited on Page 2-1 which reads:

"Improvements are desired which will, (a), decrease the size, weight and discomfort associated with the equipment which must be worn on or about the head of the flyer.

And then skipping down to Paragraph 2.1.2:

"The discomfort of flying headgear is to a large degree attributable to the interphone equipment. There are many degrees of discomfort. It can hardly be expected that the flyer's environment can be kept 'comfortable.' The degree of discomfort which we are concerned with here is in the category of intolerable, specifically, the complaint has been called 'ear torture.' It is reported as being of such degree as to detract from the operational effectiveness

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of flying personnel on long-range bombing missions. If a man is supposed to wear his helmet for the duration of a flight, but cannot because of intolerable pain, and without it he is not only inadequately protected, cannot be adequately supplied with oxygen, and is inadequately prepared for emergency flight conditions, then the condition is an operational hazard. Hence, elimination of discomfort has been an urgent necessity."

That is the statement of the commission which you undertook, is that not correct?

A That is a statement from the report of Mr. Veneklasen's company. Western Electro-Acoustic, and I would only disagree with the degree to which he expresses this. The earphones in question were on the ear type, but had a very soft packing and a silken covering and it was the time that they had to be in contact which made them uncomfortable.

Initially they were very comfortable to wear.

Q You have put some qualification on the severity of the discomfort problem, but my question is addressed to whether or not the commission that the panel of experts undertook to solve, was to solve that discomfort problem.

A That was the problem.

Q Is it fair to say --

A Part of the problem. Excuse me. It was just.

1 one of the items.

2 Q All right, I accept that.

3 Is it fair to say from that and from other
4 background of which you are aware that in the convening of the
5 panel of experts in 1956, at least through 1961, the entire
6 headset industry was extremely weight-conscious? Comfort-
7 conscious in headsets?
8

9 A What was the first part of the date?

10 Q At least from the date of the convening of the
11 panel of experts whose commission we just read.

12 A Yes.

13 Q What tangible result came out of the work of the
14 panel of experts by way of a solution to that described
15 problem?

16 A We simply made recommendations and the Air Force
17 made judgments as to whether they should be implemented.

18 Q Was there any piece of hardware that pilots now
19 enjoy or have at any time enjoyed since the panel of experts'
20 work that solved any of the problems that we have just
21 enumerated when we read the part of the commission to the
22 panel of experts?

23 A In my opinion, unfortunately very little. The
24 reason is that the group that initiated this contract was
25 essentially abolished by Air Force reorganization and I

1 zb-8

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2 believe even by the time the contract was completed, they
3 were no longer in existence, so they were not in a good
4 position to implement the results.

5 Q The point that I make now is that the copy of the
6 -- the portion of the report that has been included in Defend-
7 ant's Exhibit H does not include the page to which I would now
8 address your attention. Defendant's Exhibit H includes a
9 portion of the report of the panel of experts and I am look-
10 ing for another page -- I found it. It is, your Honor,
11 Plaintiff's Exhibit 28, which the page numbered 1-12 is the
12 one to which I now address attention. This page 1-12
13 that was not included in the Defendant's exhibit is entitled
14 "Systems recommended for future research and development
15 by the panel of experts."

16 That is correct, is it not?

17 A Yes.

End 3B

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2 Q It has two columns on this page, the left-hand
3 column reading "Projection." I take it that means the
4 input from the user's voice?

5 A Yes.

6 Q And the second column reading "reception,"
7 which I take it is the sound coming into the earpiece?

8 A Coming to the ear.

9 Q Coming to the ear. The systems recommended for
10 further research and development are, first, a tooth microphone
11 in combination with a speaker in the helmet.

12 Has that ever proved to be feasible by anybody
13 at any time since the work of the panel of experts or anybody
14 else, for that matter?

15 A Mr. Veneklasen of Western Electro-Acoustic gave
16 an excellent paper on the results of his research on the
17 tooth microphone, but, as I said previously, the really
18 interested parties in this matter were in the laboratory that
19 was discontinued. This function was discontinued between
20 the beginning of this contract and the end of this contract,
21 and to the best of my knowledge that particular piece of
22 research and development has not been implemented.

23 It may have been, but I am not aware of it.

24 Q All right. Then we go on to the combination
25 that is next recited, a tooth microphone with an external

1 gab-2

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2 speaker.

3 A. That also has never been implemented. The tooth
4 microphone, to the best of my knowledge, has not been made
5 standard Air Force equipment.

6 Q And as a practical matter, don't you recognize
7 now today that the tooth microphone is not a practical com-
8 mercially feasible approach at Air Force radio telephone com-
9 munication?

10 A By the latter, do you mean like control towers
11 and places like that?

12 Q I would include control towers and airplanes
13 both, where they are trying to have the people be able to use
14 their mouth for whatever else they want to use it for.

15 A As Veneklasen demonstrated, it was something that
16 could be used where another problem, which I believe is listed
17 in here, that of intelligibility under very difficult noise
18 conditions, it would have been a compromise that one interested
19 in high intelligibility under difficult noise conditions
20 would have accepted, just like you accept the discomfort of
21 a throat microphone or a headset. It would not be something
22 that you would like to wear in your mouth.

23 Q And it certainly is not anything that you would
24 intend to design to be used by 700,000 people that have
25 bought the plaintiff's headsets, you would not expect it

1 gab-3 Martin-cross

2 to be useful for the public?

3 A I would not expect it to be useful for general
4 public use.

5 Q Let's turn next to the noise canceling mike in
6 combination with horns surrounding the ear.

7 I take it hors means one of these variable cross-
8 section devices.

9 A That is correct.

10 Q Was that ever implemented for any commercial
11 purpose, so far as you know?

12 A Well, the horns surrounding the ear were intended
13 to be part of a helmet and I know experimental helmets
14 were made this way. The purpose of this was to prevent having
15 any necessity for contact with either the outer ear or the
16 portion of the ear that is contacted by molded inserts.

17 Q And my point is that it was another idea that was
18 experimented with but so far as we know it has never come
19 into actual enjoyment so that people flying around, people in
20 radio towers, people anywhere, they don't use that today, so
21 far as we know, isn't that correct?

22 A It is possible that it is used in helmets for
23 Air Force purposes. We haven't had any helmets submitted to
24 us for seven or eight years for test. So I can say with
25

1 gab-4

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2 certainty. But to my knowledge, this is not in use.

3 Q All right. The next recommendation is forehead
4 mike in combination with forehead band -- I think that should
5 be translated bone -- forehead bone conduction receiver.

6 Has that ever been implemented commercially?
7 And I am including by "commercially" in regular Air Force or
8 military operations as distinguished from any laboratory
9 experiments. That is the line I am trying to draw, between
10 laboratory work and bona fide use.

11 A No, although this was experimented with and
12 found feasible from a technical stand, to the best of my
13 knowledge it has not been implemented in the Air Force.

14 Q I guess, then, that the summary point is that none
15 of the various recommendations for further research have ever
16 matured into anything that has been enjoyed by the people
17 in either the Air Force or in the headset or telephone industry.

18 A That is correct. I really feel largely because
19 the reorganization that occurred terminated contracts and
20 interfered with the progress in the state of the art.

21 Q I direct your attention to another point --
22 THE COURT: Let me ask you this: This was
23 a published report?

24 THE WITNESS: Yes.

25 THE COURT: It became available not only to the

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2 Air Force but to manufacturers in the field, I suppose?

3 THE WITNESS: Yes.

4 THE COURT: Those companies are always looking
5 for something better, aren't they?

6 THE WITNESS: Yes, they are.

7 THE COURT: Even though the Air Force might cut
8 off a research grant, I should think that companies like
9 Roanwell would be always on the lookout for something better
10 and if there was anything here that really commended itself
11 to practical use in the world we live in today, somebody
12 would have picked up the ball and run with it, or is that
13 a fair assumption?

14 THE WITNESS: I think that is a fair assumption.
15 Sometimes circumstances change and something that appeared
16 like a good technical idea can become practical, but I
17 agree with you that this information is available to manufactur
18 ers and while some of these ideas are ingenious and tech-
19 nologically satisfactory, they are not what you would hand
20 someone in the general public to use.

21 Q I believe you have just usurped what I was going
22 to lead up to in two minutes. Let's go on in this manne
23 if I may.

24 I address your attention now to the table that
25 ends the report of the panel of experts, which was labeled

I will ask you this question: Did the panel of experts recommend further work on the combination of a probe tube to the ear of more than one and a half inch length which we are using now and have those other acoustic things we have talked to, probe tube to the ear mike of more than one and a half inch, and Number 2 from the other side, probe tube to the ear of more than one and a half inch in length? Did the panel of experts recommend further research on that combination that is listed on that table?

A I am just puzzling over the more than one and
a half inch to the ear. I don't understand why that is

part of the question.

THE COURT: Answer the question without it, then.

THE WITNESS: All right.

A This combination was discussed by the panel of experts. In the case of the probe tube to air mike, the microphones that were in use and were right on the table before them had this. With regard to the probe tube to the ear, everyone present on the panel had personal experience with insert-type earphones. These were also known to be somewhat uncomfortable, and since comfort was one of the main things that we were working toward, it was not recommended that this combination be tried.

It was because of the discomfort of things in contact with the ear at all that the helmet problem was proposed to be solved by having a transducer with horns coming around within the helmet to the vicinity of the ear.

Q So far as we know, then, in spite of the effort of the panel of experts, the first man that ever put together a combination of item 2 from the report of the panel of experts, probe tube to the air mike using more than an inch and a half length, and probe tube to the ear, using a tube of more than one and a half inch, the first man in creation that ever did that was named Keith Larkin, right?

A I believe you indicated that the panel -- accord-

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2 ing to the panel of experts. The panel of experts did
3 not consider the question you just asked me.

4 Q My question is so far as you know, and you
5 qualified yourself as an expert in the art, the first man
6 in the world that ever put that combination together was
7 Keith Larkin?

8 A Insofar as I know, is that what you are asking
9 me?

10 Q Yes. Is your answer yes?

11 A I have to think about it for a minute. I don't
12 know who was the first one.

13 THE COURT: You don't know anybody before
14 Larkin who did it, though?

15 THE WITNESS: If we are talking about tubes
16 for microphones and tubes for listening, both Pritchett
17 and Dreher did that.

18 THE COURT: He had one further limitation, that
19 the probe tube to the mike had to be more than one and a half
20 inches in length.

21 MR. ARNOLD: And to the ear, both sides.

22 THE WITNESS: What limitation are we speaking
23 of here, your Honor?

24 THE COURT: The question is do you know of any-
25 one prior to Larkin who put together a combination of a

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probe tube longer than one and a half inches to an air mike
and a probe tube longer than one and a half inches to the
ear?

THE WITNESS: I think in the case of Pritchett
this condition is met.

d 4A

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2 THE COURT: Has Pritchett been identified?

3 MR. ARNOLD: Yes, sir.

4 Q Is there anyone else, before we address ourselves
5 to Pritchett, besides Pritchett?

6 A I believe you said that the tube to the ear was
7 more than one and a half inches, is that correct, in your
8 question?

9 Q Yes.

10 A I was under the impression it was less than one
11 and a half inches or about one and a half inches in the case
12 of Larkin. Perhaps I am in error on that.

13 Q I will ask you, sir, please, to measure the dis-
14 tance as best you can estimate and judge with the scale and
15 the Larkin unit that I hand you from the transducer, the ear
16 transducer, to the end of the ear tube.

17 A It is greater than one and a half inches.

18 Q And how many inches is it, please, sir?

19 A About two and one half inches.

20 Q Thank you. Now I will address your attention
21 to the Pritchett Patent which is Tab No. 1 in Defendant's
22 Exhibit C, which is apparently one of the primary references
23 that the defendant relies upon, and I will ask you first
24 with respect to Figure 1, where is the transducer in the
25 Pritchett reference?

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2 Where is the transducer disclosed in Figure 3?

3 A The transducer is not shown in Figure 3. It is
4 indicated to be at the end of the tube that is terminated
5 at the upper right corner of that figure.

6 Q So here again we have the arrangement by which
7 the mouth and earpiece are connected together in one
8 common tube?

9 A That is correct.

10 Q He also discusses somewhere in the text an ear funi-
11 cular or something like that.

12 Do you remember the expression you used?

13 A I remember being somewhat puzzled by it myself.

14 Q What do you think he was referring to there?

15 A May I see the text here?

16 Q Sure, I would be happy for you to. Finial
17 is the correct word, I believe.

18 A Can you tell me where that is located?

19 Q I was hoping you would know better then because I
20 had forgotten, but we will find it.

21 Your counsel is suggesting page 4, line 52,
22 "Terminated with ear finials."

23 Would you read that whole paragraph and tell us
24 what you understand to be the teaching of the meaning
25 of an ear finial?

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2 A "Another new adaptation and combination (see
3 Fig. 4) I make use of is to cap telephonic instruments with
4 conical or segmental caps, or enclosures of other shapes,
5 made with metal, ebonite, or suitable materials, and having
6 a tube or tubes (elastic or otherwise) terminated with
7 ear finials and pads to cover the ear or ears of the person
8 using them, so as to shut out sounds. Mouthpieces or tubes
9 adapted for transmitting sounds or messages will be
10 branched and fixed on the caps, and adapted for the use
11 of the mouth (as shown at A in said Fig. 4)."

12 Q What is the meaning of the word "finial" as used
13 there?

14 A I interpret this to mean a tube.

15 Q Is there not a connotation there is some little
16 annular member around the tube that will make it fit
17 the ear or do you get that connotation at all from the word
18 finial?

19 THE COURT: Excuse me. You are saying that a finial
20 is a tube?

21 THE WITNESS: I don't know, frankly, what a finial
22 is. If someone has a definition, I would like to hear it.

23 THE COURT: I don't see how you can say that when
24 you read it in context, because what it says is, "having
25 a tube or tubes (elastic or otherwise) terminated with

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2 ear finials."

3 He is not talking about a tube terminated with a
4 tube.

5 THE WITNESS: I stand corrected.

6 THE COURT: A finial in its normal sense is a
7 termination or cap. A finial is a little thing you screw
8 on top of a lamp to hold a lamp shade on.

9 THE WITNESS: Thank you. I agree that some
10 termination at the ear end of the tube is indicated.

11 Q Now I have lost my train of thought as to where I
12 was going.

13 We had gotten up to Figure 4. In Figure 4 he
14 discloses a transducer, does he not, the Pritchett Patent?

15 A Yes.

16 Q And that transducer is a single transducer that is
17 to be used both for transmission and receiving?

18 A That is my understanding.

19 Q In electric powered telephony, including FAA
20 operations, radio telephony from aircraft to ground, Bell
21 Telephone System, this type of thing, is it in that applica-
22 tion feasible, with the various parameters that you need for
23 that purpose, is it feasible today even to use one transducer
24 both for sending and receiving? Practical, I mean, not
25 theoretical in a laboratory or in a house intercom system,

1 but in regular telephony is it feasible to use one transistor
2 to both send and receive?
3

4 I mean one transducer?

5 A It is feasible and it is done in many inter-
6 communication systems. Switching is required as you go from
7 speaking to listening, because amplifiers intervene in modern
8 systems. In the time of Pritchett, this was not a
9 factor.

10 Q Now I come back to my question, please, which I
11 believe you didn't track. My question is that in today's
12 electric powered telephony, not somewhere else, I am
13 speaking about today's electric powered telephony, is it
14 feasible to tolerate, for example, the switching that
15 you talk about where, after you get through listening, you
16 have to punch a button to go into the transmit mode or
17 have to have the delay for a sound powered switch to operate.
18 In the commercial real world of today, is it feasible
19 to use a single transducer for both the receive and transmit
20 modes?

21 A With a voice-operated relay or with any one of a
22 number of mechanical controls, it could be used hands free.

23 Q A mechanical control you could change from receive
24 to transmit hands free, can you describe one of those?

25 A Well, I conceived one myself at one time when I

2 was thinking about using the earphone as a microphone
3 as well. Because it was on a headset, I had a chinstrap
4 on it already and all that I had to do to switch from
5 one to the other was extend my jaw and it would open a micro-
6 switch and perform this operation.

7 Q So that where we have the problems of a trans-
8 mission and receiving through one transducer we have to have
9 some switching arrangement of which that is one example
10 that you conceived as being a feasible approach at one time?

11 A Yes, in any system that involves amplification.

12 Q Yesterday you mentioned sound powered phones quite
13 a number of times and I am not sure I recall in all of the
14 different applications that you mentioned the expression,
15 but if we leave out field equipment for the battle zone,
16 battle telephones, and Navy ships where you have a large
17 amount of telephony over distances measured in hundreds of
18 feet rather than miles, if we leave out that, what per cent
19 of the total market for telephonic use is in sound powered
20 rather than electric powered equipment?

21 A It is a very small percentage because telephones
22 are everywhere and the only real advantage in an
23 industrial situation would be to put in a temporary telephone
24 line of your own and establish communication between two
25 points temporarily. If you were going to do it permanently,

1 you would probably call the Telephone Company.

2 Q And so if we leave out those unique military
3 operations, the sound powered market is on the order of magni-
4 tude of less than .1 per cent of the total telephone
5 communication market, isn't that right?
6

7 A I don't know the current figures, but I will accept
8 your estimate.

9 Q Now I direct your attention to Pritchett Figure
10 7. That's on the next page there. Suppose we substituted
11 a modern 1975 variety Knowles or Western Electric transducer
12 for each transducer shown in Figure 7.

13 A Excuse me. I haven't found Figure 7 yet.

14 Q It is two pages over. I misled you where it was.
15 My question is to assume that we substitute under that system
16 a 1975 variety Knowles transducer or Western Electric
17 transducer for every transducer that is shown in that draw-
18 ing.

19 Would you feel that though that could be done that
20 you have a commercially viable arrangement?

21 A Voice tubes of this size and these lengths would
22 not be commercially viable today.
23
24
25

2 Q And so the point is that if you were paying the
3 bill at Baldwin for somebody on your R&D staff to make a
4 headset that would enable you to break into the market from
5 scratch, you would not have him read the Pritchett reference
6 as a source of information, would you? You wouldn't pay for
7 him, you wouldn't want to pay for him to read the Pritchett
8 reference as a source of information to enable Baldwin to
9 crack into an entrenched market like the headset market
10 was in 1960?

11 A I would probably show it to him out of a matter
12 of interest because the man did have some basically sound
13 ideas far ahead of his time but it is true that I would not
14 give him this as a model to follow in his development
15 program.

16 Q Do you realize the date of the Pritchett reference
17 relative to Mr. Bell's telephone?

18 A I don't know the exact relationship. They were
19 of somewhat the same era, I believe.

20 Q Mr. Bell patented his telephone two years earlier
21 than Pritchett, British Patent No. 191, Pritchett reference.

22 Finally let's go back to the table prepared by the
23 panel of experts. Would you submit this to anybody
24 in your plant and suggest to them this teaches you how
25 to design the headset that has a combination of user

2 comfort, low weight, high versatility and adequate voice
3 transmission for us to crack into the market?

4 And I am referring to Exhibit 27-A, the table from
5 the committee of experts, panel of experts report.

6 A For a research project in this field, I think
7 that the table is still a good table.

8 Q It is not my question. Certainly it is a good
9 table. Does it teach a man of ordinary skill in the art how
10 to build the set that accomplishes a combination of user
11 comfort, low weight, high versatility and adequate voice
12 transmission, does it teach a man of ordinary skill in the
13 art how to do that?

14 A Well, in design there is a combination of technology
15 and field conditions and judgment, user reaction, all of
16 these things are involved. This table does not purport
17 to teach all of those things. It concentrates primarily
18 upon the electro-acoustic and acoustic means by which to
19 achieve these ends.

20 THE COURT: Isn't this table, in fact, a cataloging
21 of every known method of transmuting pressure waves into
22 electrical waves, every means known of coupling such means
23 to the source?

24 THE WITNESS: It was intended to be comprehensive.

25 THE COURT: So it doesn't really direct anybody

2 at all. It just catalogs the whole field?

3 THE WITNESS: It was not intended to write a
4 specification for a particular design.

5 THE COURT: And on this table there are literally
6 hundreds of thousands, if not millions of permutations and
7 combinations of the various possibilities?

8 THE WITNESS: I agree.

9 Q Really for purposes of my quotable quote to the
10 Court of Appeals, I still would like my precise question
11 answered, which I think admits to a yes or no answer.

12 Having given your explanation, is it not a fact
13 that the table which is Plaintiff's Exhibit 27-A, coming
14 from the report of the committee of experts, does not teach
15 a man of ordinary skill in the art how to make a
16 headset that is satisfactory in terms of user comfort,
17 low weight, high versatility and adequate voice transmitting,
18 is that not a fact, yes or no?

19 A This table does not provide sufficient
20 information for that purpose.

21 Q Now, I would take you back to your employment
22 experience with Baldwin where you worked, I believe you
23 said since 1949?

24 A Yes.

25 Q Is that correct?

A Yes.

Q Have you had any work there at Baldwin in the headset art?

A Yes.

Q Will you identify the nature of that work in the headset art as distinguished from hearing aids or other things specifically headsets?

A From 1950 or '51 until 1958, I was busily engaged in work for the Communication and Navigation Laboratory on government contract between the Air Force and Baldwin in various intercommunication problems, chiefly intercommunication within the aircraft but by no means exclusively that.

In 1958, according to my recollection, the series of contracts was terminated by the reorganization of audio activities within the Air Force. Since that time there have been several contracts intermittently spaced over the ensuing period of time; all Air Force contracts and all related to microphones, headsets, earphones, that sort of thing.

Q In addition to that background you had prior background in headsets with RCA?

A For eight years.

Q You are an inventor of one headset patented

2 item and so forth. But as I understand your testimony,
3 you yourself, neither directly yourself or by supervising
4 others, have ever actually designed a headset that included
5 the combination of lightweight, user comfort, high versatility
6 and adequate voice transmission?

7 A If I understood that question correctly, I could
8 not agree with it without confessing to an entire career
9 of ineptitude.

10 THE COURT: Well, that's not an excuse for not
11 answering.

12 THE WITNESS: Well, then I don't agree.

13 Q Will you identify the headset that you described
14 that produced an adequate combination of user comfort,
15 low weight, high versatility and adequate voice transmission?

16 A All of these are somewhat relative and have to be
17 taken within the context of the times and the application.

18 The RCA MI 2454A headset, which was used extensively
19 in sound powered systems, which embodied the patent that you
20 referred to in my name was considered to meet these require-
21 ments for military purposes. It was much lower in weight
22 than previous headsets. It was still in contact with
23 the person and therefore entirely not comfortable but it
24 was comfortable enough to be worn for long periods of time
25 by many people.

2 A sound powered telephone is very versatile. It
3 can even be used without amplifiers and without switches.
4 The voice transmission was adequate for the Navy purposes
5 or they would not have been using it.

6 MR. ARNOLD: I would address the Court's
7 attention, please, to Plaintiff's Exhibit 34, which is
8 one of the places we have a copy of Dr. Martin's patent in
9 evidence.

10 Q I will address your attention to it also, Dr. Martin.
11 Is not the earpiece and the mounting for the earpiece dis-
12 closed in your patent a perfect example of the kind of
13 mounting which, when the units were worn for long periods
14 of time, would cause these sore pressure points on the ears,
15 the things that was called ear torture in the commission to
16 the panel of experts some years later?

17 A There is some correlation here but I would point
18 out that when I used rubber tips, such as stethoscope tips
19 before this invention was conceived, this was considered
20 by some people to be highly uncomfortable, even though the
21 doctors do it all the time.

22 Today almost the same thing is worn by airlines
23 passengers as they ride in comfort across the country and weare
24 tolerability for this type of thing is quite different at one
25 time than it is at another.

2 THE COURT: This isn't the thing that I have worn
3 on the airlines in that the thing that I wore most
4 recently was nothing but a pair of ear tubes with a couple of
5 lightweight, shall we say finials, that we inserted into the
6 ear. It didn't have a transducer integral with the ear tube
7 or -- it was mounted on the same assembly as the ear tube.
8 It didn't have a headband going over the top of the head to
9 connect two such assemblies. When you say it is similar
10 or the same, I take it you are referring only to the
11 fact that this has something that goes into the auditory
12 canal and the airlines device has something that goes into
13 the auditory canal?

14 THE WITNESS: That is correct.

15 MR. BRADLEY: Your Honor, I think there may be
16 a misunderstanding of the witness' answer. I thought he was
17 talking about two different things. Could I ask the reporter
18 to read back the witness' answer.

19 THE COURT: All right. I don't want to be unfair
20 to him. Go ahead.

21 (Record was read.)
22
23
24
25

2 MR. BRADLEY: That speaking of stethoscope
3 tips that came about before the patent, as I understand
4 what the doctor means.

5 THE COURT: All right.

6 THE WITNESS: That is correct. What I wear
7 on an airline is very much like a stethoscope with a little
8 loud speaker or earphone unit at the sending end.

9 Q Let me ask you another question about commercial
10 feasibility in the real world of today where people can enjoy
11 it because things that are laboratory curiosities don't
12 have any meaning to me. Maybe they should, but I am thinking
13 about letting people enjoy something.

14 Do you think that it is feasible to use this
15 thing that you discovered and that Dreher discovered and that
16 Bell Laboratories have all discovered independently, the
17 signal from the speaker derived through his own ear canal
18 to a transducer, do you think it is feasible to use that in
19 the real world for a headset today?

20 A I don't consider this to be an optimum means for
21 picking up speech by far.

22 Q All right, is it fair then to say in view of
23 what you have testified about Pritchett and also about
24 Dreher, without going onto the others, that quite commonly
25 you find in the prior art recitations that are not helpfully

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2 leading but that actually would lead you down a path into
3 a box canyon where you would come out with a commercially
4 unacceptable product?

5 Isn't that a common experience in reading the
6 art?

7 A Many patents are never commercial.

8 Q That isn't an answer to my question.

9 A Sorry.

10 Q My question is, isn't it true that when people
11 are looking for sources of information and ideas in the pub-
12 lished art, they read patents and they find that frequently
13 the patents suggest ideas to them which, if they followed
14 that idea, they would be wasting time and money developing
15 into a box canyon where after wasting time and money they
16 would not have a commercial product?

17 A I would agree.

18 Q And that is a very common experience and some
19 people won't even read a patent as a source of information
20 because they are afraid they will get misled, is that right?

21 A There are probably people like that. They would
22 certainly make a mistake if they didn't take advantage of
23 all of the patent literature.

24 Q All right. Now I would direct your attention--

25 THE COURT: I think this is a good time for our

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2 morning break.

3 (Recess.)

4 THE COURT: Are we slipping behind our schedule?

5 MR. ARNOLD: We surely are, your Honor. We are
6 slipping on.

7 Q Dr. Martin, at recess I advised you of my
8 next question in hopes of accelerating the answer.

9 Can you identify for us the various references
10 that the defendant has relied upon as to which we know there
11 has been a substantial commercial enjoyment of the invention?

12 A I will to the best of my knowledge.

13 THE COURT: I assume when we are talking about
14 ear torture, you don't -- you include that as being within
15 the term enjoyment of the invention?

16 MR. ARNOLD: Yes.

17 A The first item in this book is the Pritcnnett
18 patent. I have no way of knowing whether it was in use
19 or not. I would be -- well, I don't know. It is so long
20 before my time, I don't know. Acoustic tubes, of course,
21 were old before telephonics came along. It might well have
22 been used but I do not know.

23 The Olney patent has been used. We used it in
24 the M33 microphone which I previously mentioned.

25 Q That was the one that was very, very widely

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2 used and written up and so forth as well as just used a
3 little bit, correct?

4 A Oh, yes. It was used throughout the Air Force.

5 Q Proceed to the next one.

6 A The Martin patent was certainly used. The
7 Gilbert patent appears to me to be a patent for the Telex
8 Twinset which has been very widely used.

9 Q Yes, as a matter of fact we have agreed that the
10 ARINC disclosure on the Telex Twinset and the Gilbert patent
11 all disclose essentially the same instrument. They are all
12 part of the same commercial undertaking.

13 A While I have not personally seen the Robertson
14 patented device used in a telephone operation, I assume that
15 it has been used widely or they would not have advertised it
16 over such a long period of time.

17 Q You know that it has been advertised but you
18 are not personally acquainted with the physical specimen of
19 the set?

20 A That is correct.

21 THE COURT: Which one was that?

22 THE WITNESS: Robertson. There were two patents
23 by Robertson.

24 Q Are those the British ones?

25 A Yes.

1
2 Q All right. Both of them were British, both
3 of the Robertson patent references?

4 A Yes, sir. With regard to Dreher, in the exact
5 form that it is shown here, I know of no commercial use. The
6 part of putting a voice tube on a molded insert that has an
7 earphone receiver on it certainly has been used.

8 Q You are speaking now, for example, of the Model
9 61?

10 A Yes.

11 Q All right.

12 A I don't know whether the Henderson patent has
13 been used or not. It appears to me to be practical enough
14 in Fig. 1 it could well be used, but I don't know.

15 I guess the Guttner patent must have been used
16 because I think it has been the subject of an infringement suit
17 just within the last year in this country.

18 Q At least if not that particular patented struc-
19 ture we do know that hearing aids of that general type were
20 very commonly used back in that vintage, right?

21 A Yes.

22 Q We have made reference to the Telex unit as an
23 example of one of the pieces of art that have been used and
24 I would ask you, do you recall whether that unit was found
25 acceptable for commercial purpose by Continental, by the

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2 FAA, by NASA or by any of the other people that we know
3 of that ever did comparative tests?

4 A What was the adjective you used after "found"?
5 Did you say found successful? Excuse me.

6 Q The Telex Twinset unit we know was offered to
7 United in response to their inquiry. My question is do you
8 know whether anybody, United or others who did comparative
9 tests found the Telex Twinset to be a satisfactory unit by
10 comparison with the Larkin patent?

11 A So many were used that I am sure someone did, and
12 I don't know a specific case. I can quote the Air Force
13 pilot, I believe it was, who combined the Telex Twinset with
14 a voice tube leading to a M32 microphone as an example to
15 Dreher of something that he would consider more comfortable
16 than what he was using.

17 Q I would read you from the deposition of Mr.
18 Leonhardt, Page 25, Mr. Leonhardt being an engineer with
19 United to whom the Telex Twinset had been shown in response
20 to their solicitation for something that was satisfactory
21 to solve their ear torture problem.

22 "Q What was United's reaction to that Telex unit
23 when they finally delivered the sample or showed you the sample

24 "A Well, it was quite favorable in that we liked
25 it for its light weight. It was relatively rugged and quite

App. 785

comfortable to wear. The only real objection we had was the large boom microphone that was in front of the mouth of the pilot.

"Q What was the objection to that?

"A Just from a mass standpoint, it would not stay there. If you placed it there for talking or moved your head around to do other cockpit duties, this particular one would walk away or move. It would not stay there. It would reduce your output in the transmissions to the ground."

Do you know of any other set other than Larkin that didn't suffer either those problems that United found with respect to the Telex Twinset or some other problem that made it unacceptable for NASA, FAA or NASA ground controllers when they didn't have helmets? We know on the helmets they sometimes did other things. FAA or airline use?

MR. BRADLEY: Excuse me, counsel.

I was confused by your earlier question. I think there is a confusion between what the Twinset is. The Twinset is not the one that had the boom mike on it.

MR. ARNOLD: I thought we had reached agreement that the offering to use United by Telex was the Twinset with a boom mike A.

MR. BRADLY: That is fine.

MR. ARNOLD: That is what the testimony that

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I read was addressed to.

MR. BRADLEY: That is correct. I just wasn't clear whether you were talking about the Twinset itself or the Twinset that had the boom mike attached to it.

MR. ARNOLD: I apologize if it left it unclear.

Q Well, my point is, do you find the Telex Twinset with boom mike added to be highly satisfactory and competitively equivalent to the Larkin MS50?

A I have never made this comparison. I have made acoustical experiments on the MS50 at the request of the Air Force in comparison to a number of other headsets some years ago, but I have not measured the particular combination you are speaking of for Telex.

End 5B

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2 Q And you did acoustical measurements, I gather,
3 rather than use a comfort stability measurement of this
4 type?

5 A No. We had an experimental psychologist in
6 our department who conducted and reported extensive tests
7 on wearability and comfort and speech quality and things
8 like that.

9 Q Let's get on. As recently as a week or two weeks
10 ago were you involved in discussions with Mr. Mol or somebody
11 else expressed a view that the db loss resulting from extend-
12 ing the mouth tube in either the R70 or the R71 might be a
13 substantial db loss as distinguished from something like a
14 half db or one db which was shown on the charts you intro-
15 duced yesterday, the plots you introduced yesterday?

16 A Are you asking if I heard some testimony he
17 gave on it?

18 Q No. Have you heard any other conversations
19 with anybody where the quantity of db loss resulting from
20 extending the tube was the topic of conversation?

21 A I have discussed with him a measurement of this
22 type, yes.

23 Q And were you surprised to find that the db loss
24 was as little as half a db or one db when you extended the
25 length of the voice tube from its short position to its long

1 gwb-2 Martin-cross

2 position?

3 A Not particularly.

4 Q Did you utter a suggestion that it would be
5 a great deal more than a half a db or one db?

6 A I don't recall. I have spoken previously of
7 a 10-db difference, but this was under quite different cir-
8 cumstances and many years ago.

9 Q Have you heard anyone else utter the suggestion
10 that it would be a great deal more than a half db or one db?

11 A I am sure I have at some time.

12 Q Do you remember who that was within the last
13 couple of weeks, if anybody?

14 A I am not sure if I have within the last couple
15 of weeks.

16 Q Are you able to identify anybody at an earlier
17 period of time that had suggested that the db loss if you
18 extended the tube on one of these headsets from its short to
19 a longer position would be greater?

20 A I am puzzled by the emphasis that is being placed
21 on this particular point and I have talked about these things
22 so many times that certainly some time in the past someone
23 has talked about losses in tubes, and when I said that I
24 undoubtedly had heard this, this is what I had in mind. I
25 have no specific conversation or person in mind.

1 Q My point -- you are puzzled about the point
2 and maybe there is no reason for you to understand what
3 my point is -- my point is it is still a common thing, is it
4 not, to find people who when they see tubes of the fifty-
5 thousandth diameter they are appalled to find that the attenua-
6 tion when you add another inch on it isn't a terrible thing,
7 there are still a lot of fairly informed people who are
8 terribly puzzled about the low db loss in the length of a tube
9 of fifty thousandths in diameter, isn't that correct?

11 A There are many people in this generation who
12 never heard of speaking tubes as used in past generations.

13 Q I am talking about many people of technical back-
14 ground who have had courses in acoustics in college and have
15 some general familiarity, there are still a lot of them
16 running around loose that somehow get suspicious of the idea
17 that the attenuation in that small tube isn't going to be a
18 pretty good amount of attenuation for every inch, isn't
19 that a fact?

20 A There are undoubtedly some people who think that
21 because probe tubes of smaller diameter which are purposely
22 built to have attenuation and high mechanical acoustical
23 impedance exhibit some of these properties. Anyone familiar
24 with the use of tubes in the hearing aid industry and in the
25 microphone or headset industry would not be so confused.

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Martin-cross

2 Q Yesterday you testified that given certain
3 assumptions, and my problem is to try to avoid misquoting you
4 while reminding you of the subject matter I am trying to
5 raise, something to the effect that you could combine an ear-
6 plug from the Henderson reference with the Dreher reference.
7 Is that a fair characterization of your testimony?

8 A I think it could be done.

9 Q Let us suppose that you did so. Would those
10 references tell you whether the arrangement, when you had
11 finished doing that, would provide you with adequate user
12 comfort?

13 A Would the combination of reference tell me that?

14 Q Yes. You read those two references and say,
15 "Aha, I will pick this one from this and plug it in there,"
16 do you know what the user comfort is going to be when you
17 make that move?

18 A I don't recall whether comfort is mentioned in
19 either of those patents. I haven't examined them for that
20 purpose.

21 Q And you are not able to say, then, they would
22 teach you anything about how to get your comfort if you
23 made that combination?

24 A I don't understand how this question differs
25 from what I thought I answered before. I am sorry.

gwb-5

Martin-cross

Q My point is that if you made it when Roanwell saw, for example, the StarSet in brochure form and they got to work and made layouts and they visited with Unex and Unex went to work, they still had big question marks about the human engineering and they laid it out this way and they laid it out that way, and they laid it out the other way.

When Bell decided, in response to the Larkin invention, that they had to get something else and they tried the 11 and it was subjected to a comparative test and it failed so they tried the 61 with the ear insert and it ended up not having adequate user comfort, when other people tried to react to the Larkin invention or something that went into the Hutchings invention and go forward to make something new, they had a whole lot of problems, they experimented this way and that way and they got patents that turned out to be commercial flops as in the Bryant patent on the Bell 61.

Isn't it true that if you combined, say, the plug from Henderson and Dreher that you still wouldn't know whether you had a commercially viable operation just from making that combination?

A You have to use something and to produce it and to sell it before you know whether it is commercially successful. But commercial success depends upon other factors than your comfort and technical feasibility and

1 gwb-6

Martin-cross

2 that sort of thing. It is a complex subject.

3 Q But the invention of the whole that we are
4 talking about in connection with Larkin and Hutchings
5 inevitably does include the engineering exclusions as well
6 as the technical exclusion and the tube in front of the mouth,
7 all those things are part of the invention as a whole,
8 are they not?

9 A I may be wrong, but I thought that the invention
10 was really defined in the allowed claims, but that is a
11 legal opinion to which I am not entitled.

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2 Q Accept with me as a premise for my purposes of
3 questioning you that I define the invention as a whole as
4 being the totality of the thing that makes it interesting
5 for public enjoyment and that that would include the human
6 engineering problems. Accept with me that definition
7 arguendo.

8 If that is the proper definition, which I ask you
9 to accept with me arguendo, isn't it quite clear that the
10 mere combination of an ear tube from Henderson with Dreher
11 would still leave you without the invention having
12 been -- the invention as a whole in the context I have
13 described, with that invention not yet having been made?

14 A That is correct.

15 Q Now you remember an interview with Mr. Clark
16 and Mr. Bradley on behalf of Roanwell and Mr. Janicke on
17 behalf of Plantronics on November 2, 1974, and at that time
18 you indicated a significant experience, I believe, in
19 post-aurical hearing aids which you I believe have already
20 described to the Court-- have I misstated that or is that
21 correct?

22 A I don't quite know yet what you are referring to.

23 Q First, do you recall an interview in which Mr.
24 Janicke on the one hand and Mr. Bradley and Mr. Clark
25 participated?

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2 A I recall the interview very well.

3 Q And whether you stated it there or not, which the
4 transcript I believe suggests that you did, it is true that
5 you did have and have had a lot of experience with post-
6 aural hearing aids and with headsets?

7 A Yes.

8 Q How many different types of combinations of headsets
9 have you tested in your career? I believe you said something
10 over 100.

11 A I am sure over 100 types of headsets.

12 Q And still you also stated that you wouldn't say
13 you had any experience with post-auricle headsets, is
14 that not what you stated? 100 types but never with a post-
15 auricle headset?

16 A Well, that would mean that -- I think one would
17 really have to define a post-auricle headset before I
18 could -- if we just mean something that has an earphone
19 behind the ear or has -- actually, a post-auricle headset
20 I guess implies that the transducers are behind the ear.

21 THE COURT: We are using headset here as meaning
22 anything that has a transmitting transducer and a receiving
23 transducer --

24 THE WITNESS: That being the case --

25 THE COURT: -- and mounts on the head.

THE WITNESS: That being the case, a post-auricle hearing aid would be a post-auricle headset, in which case I was in error.

THE COURT: But the transmission there is internal?

THE WITNESS: Right.

THE COURT: You are just coupling from the microphone through an amplifier to a receiving transducer. We are distinguishing in that respect hearing aids from other kinds of headsets.

THE WITNESS: In that respect, where amplification is local rather than remote, I have not had experience with post-auricle headsets.

Q To make it clear, the transcript of that interview -- you executed a transcript of that interview, did you not?

A Yes, I did.

Q I am quoting from page 1:

"MR. JANICKE: Yes, behind-the-ear type, without any headband and so on.

"MR. MARTIN: I have experience with post-auricle hearing aids. I wouldn't say particularly with post-auricle headsets."

Now, you also stated in that interview that you did have experience with an ear tube -- and here I am quoting again -- "In combination with that I tried both a

conducting tube to the earphone from the mouth picking up speech."

And then after some further exchange about the date in question, you stated, "I would say that I worked with the combination of tubes going both ways in the '40s."

That is from page 13 of the transcript.

Then quoting Mr. Janicke:

"You say that you tried a sound tube from the mouth of some kind, in combination with some kind of sound tube to the ear, before 1961. But you decided that was not the way to go?

"MR. MARTIN: Well, there were many considerations. The question sounds as if the experiment was a failure. That was not the case."

Then when you were asked to sign the transcript you first added an addendum which did not deny that you had ever made the two-tube arrangement. Then in your letter of January 4th, however, after further prodding by Mr. Janicke for something specific about this, we asked you to look at your records and find out, and then you wrote on January 4th, "However, I do not presently recall combining in one headset microphone assembly (1) an acoustic tube from the mouth to a microphone and (2) an acoustic tube from an

earphone to the ear canal, either at that time or at any time prior to 1961.'

Now, is it not a fact, then, that you changed your position exactly 180 degrees between the first interview and the writing of that letter?

MR. BRADLEY: Your Honor, I object. This was all done by an agreement between counsel and it was done so that the witness could review his documents, the ones he had left from 30 years ago, and it was done in connection with what we would rely upon, in terms of what is in the documents.

The witness looked at them. We made agreements with counsel as to what we would rely upon and what we wouldn't and this is all reflected by what is in these documents.

I have no objection to counsel questioning the witness about this but I resent his implication that the witness changed his mind as to what the facts were or were not. The question was what was reflected in reports that he could still find that were generated years ago.

THE COURT: Did or did not he change the substance of his testimony and later say that he could not remember ever combining a receiving tube with a voice tube?

2 MR. BRADLEY: I'm not sure as to -- this was in a
3 telephone interview at the outset without the witness having
4 any documents in front of him and he gave an indication
5 as to what he thought might or might not be the case
6 and he would check his permanent documents.

7 THE COURT: I don't think that Mr. Arnold means to
8 imply there was anything improper in changing the
9 testimony. He is pointing out the fact that he did change
10 it. A witness is always entitled to change his testimony
11 if, on further reflection or further checking, he finds that
12 he made a misstatement. There is nothing wrong with it.

13 MR. ARNOLD: I would have been embarrassed had
14 you not corrected the error but I want to be sure that
15 we now know which is correct and which is the error.

16 The last recitation is to the effect you did not
17 ever build this particular combination.

18 Q Is that not correct?

19 A I believe the statement which I signed there,
20 which was admittedly done after some time, the delay
21 was not because of anything involving this case. I was
22 involved in something else that was very time consuming.
23 But I think the statement says that I do not have any
24 evidence that the combination was definitely made.

25 I did work on both of these things in connection

2 with the same projects. They are a logical combination and
3 in fact if you take the earcap of my invention which was
4 used, it was used on this same mechanical design but not for
5 the same purpose.

6 I've never made any point that I definitely
7 combined these two.

8 MR. ARNOLD: May it please the Court, the quote in
9 the earlier interview was when Mr. Janicke questioned the
10 operability of this alleged arrangement. Mr. Martin said,
11 and I quote, "Well, there are many considerations. The
12 question sounds as if the experiment was a failure. That
13 was not the case."

14 There is a very affirmative statement that it was
15 an experiment that was not a failure.

16 Then when Mr. Janicke pressed him for further
17 information with such questions in his letter as:

18 "After having reviewed your reports, what is
19 your present recollection as to whether or not you constructed
20 a headset having both an acoustical tube for conducting
21 sound from the mouth to the microphone and an acoustical
22 tube for conducting sound from a receiver to the ear canal
23 at any time prior to '61?"

24 It was in response to that that he then comes
25 back, "However I do not --" this is after further check

2 of his records. Then after refreshing his memory:

3 "However, I do not presently recall combining in
4 one headset the same thing that I quoted before."

5 A You quoted so much I feel I must get into the record
6 a little bit about this matter.

7 The headset on which I was doing the experiments
8 was one for which the use of the eartips was optional. The
9 experiment that I performed was on a tube running from
10 near the lips back to one of the transducers on this headset.
11 That particular transducer was being used both as a trans-
12 mitter and a receiver. Sound was coming from the tube
13 through the unit actually. That was getting to the back of
14 the diaphragm. The sound from the front of the
15 diaphragm was going into the ear canal.

16 What I was not able to establish upon looking at
17 my records of many years before was that I had the tip on
18 the headset at the time that I had the tube connected
19 to the headset. And this is the only reason that I made
20 that addendum. I could not establish that the tip was
21 on the headset at the time that the tube was on the headset.

22 Q All right. Let me address you then now to your
23 testimony at page 465 of the record yesterday afternoon
24 and I quote:

25 "The purpose of the patent was --" this is

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Martin-cross

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addressed to your own patent, the one you have just been talking about that had the little tube -- you had a seal on the outside and then you had a seal on the ear canal, right?

A Yes.

Q Addressing to that patent you testified, and I am beginning on line 20 of page 465:

"The purpose of the patent was not to patent an acoustical tube which I considered old at the time but to obtain patent coverage for the combination of an acoustical seal by the ear cushion against the ear and the acoustical seal between the flanges 37 of the molded earpiece and the periphery of the entrance to the auditory canal."

I ask you in context of that recitation, would that act of providing one seal inside another require only ordinary engineering skill as of that date?

A No, because there was a great deal of research went into determining the physiological factors in this, including comfort because the design of the accordian type was based upon a special type of curve which would produce a rather uniform force against the ear by the tip, whether it was extended or contracted, and there was so much research involved leading up to this that I couldn't say that it was so obvious as to the skilled or to anyone else.

2 Q Does it not sound to you like you have just
3 spoken the exact story of Larkin and Hutchings and that it
4 was not routineering or within the skill of the art for
5 their invetnions to be made either?

6 A I don't feel qualified to comment upon any state-
7 ments they may have made on this.

8 Q I am not talking about their statements. I am
9 talking about your statements as to what was routineering.
10 What was within the skill of the art. You have answered
11 that question about 15 times in the last day or two and it
12 seems to me like that the answer you just gave about your
13 own invention is the precisely applicable statement to
14 the nature of what Mr. Larkin and Mr. Hutchings did and
15 I am asking you if you don't agree as a matter of the
16 technical man working in the creative arts trying to produce
17 something that society will use and enjoy, isn't what you
18 just said about your invention a very applicable expression
19 about what Mr. Larkin and Mr. Hutchings did?

20 A All I can say is that this invention was the
21 result of a sequence of about five models, some of which were
22 good enough that they were sold to the Navy. But this was
23 the one that required the most ingenuity and the most
24 hard research work and investigation.

25 Q And Mr. Larkin and Mr. Hutchings went through

2 a series of several models, some of which were sold 700,000
3 units or 300,000 and 350,000 units.

4 Again, haven't you spoken exactly the parallel
5 that what you did was not routineering, was not routinely
6 within the skill of the art and by that same measure of whatever
7 is routine within the skill of the art, neither was what Mr.
8 Larkin did or Mr. Hutchings did within the routine skill
9 of the art, isn't that exactly the import of what you just
10 stated?

11 A To me there is quite a distinction here because
12 of the nonobvious parts of the design in the eartip of
13 that patent of mine. This is obviously a private view.
14 Someone else might look at it and say how obvious but knowing
15 the facts in the case, I think it was an ingenious invention,
16 if I say so myself.

17 MR. ARNOLD: May it please the court, I make no
18 allegations or charges about the witness but I suggest that
19 if the Court would record now the Court's opinions as
20 to the value judgment of the witness and the complete candor
21 of the witness, it will be helpful in the further proceedings
22 in the case. We have no further questions.

23 REDIRECT EXAMINATION

24 BY MR. BRADLEY:

25 Dr. Martin, I think there was some confusion

2 in at least one area of your testimony and I'd like to
3 hand you Defendant's Exhibit BBB as well as the Larkin-Dennis
4 paper, which is Defendant's Exhibit Z, and the prior art
5 book, which is Defendant's Exhibit C, and I refer you
6 to the Olney Patent shown behind Tab 2 in Defendant's
7 Exhibit C.

8 In the Defendant's Exhibit BBB you will see there
9 are two charts attached to it which are charts A and B and
10 those relate in one case to the Larkin paper and in the other
11 case to the Olney Patent.

12 Would you state what that relationship is?

13 Let me point out whether they come from one part
14 of the document or another.

15 A The chart Figure 4-A from the Larkin-Dennis
16 paper appears on the last page of Exhibit Z.

17 The frequency response of the MS-50 microphone
18 with and without acoustical tube -- excuse me -- the
19 response of the dipole microphone with the ends of the tubes
20 left open is Figure 19 from the Olney Patent.

21 These two graphs --

22 Q Excuse me. That was chart B?

23 A That was chart B, yes, sir.

24

25

1 Q There has been some numbers added to those.
2
3 Would you explain what that is?

4 A The solid vertical lines on these two graphs are
5 the original guideposts for frequency. Because they are
6 so far apart, making it difficult to estimate on a logarithmic
7 scale what the actual frequencies are, we have added some
8 vertical dashed lines. The vertical dashed lines have been
9 drawn as closely as possible at the peaks occurring in the
10 non-damped version of the Olney and in the Larkin-Dennis
11 curve with straight acoustical tube.

12 Q Are those numbers that are on those lines, I
13 assume they are frequencies, is that correct?

14 A They are frequency in Hertz.

15 Q Are they just approximations made from these
16 graphs, photocopies of them?

17 A That is correct. I interpolated, keeping the
18 form of a logarithmic scale in mind and wrote these numbers
19 down admittedly as whole number integers, knowing that they
20 would be approximately harmonic.

21 But all of these numbers closely approximate
22 what I would read. If it were 1220, or 50, I might round
23 it off to 1200.

24 THE COURT: I think at the high end of the
25 scale in the upper chart there is clearly an error.

1 zb-2

Martin-redirect

2 THE WITNESS: In which one, sir?

3 THE COURT: If you will look, you have a closer
4 space for the 800 cycle interval between 3600 and 4400 Hertz
5 than you have for the 800 cycle interval between 4400 and
6 5200 Hertz, whereas on a logarithmic scale that spacing should
7 be smaller.

8 THE WITNESS: That should be reversed, you are
9 correct. Up at that end of the frequency scale.

10 Q That appears to have been drawn through the
11 wrong peak, is it not?

12 THE COURT: No, it is drawn through the peak.

13 THE WITNESS: That's right. The line is drawn,
14 has been drawn through something that is not part of the
15 curve. It should be drawn through the dashed portion of
16 the curve, which is to the left of where the line is drawn.
17 Which would be more nearly correct.

18 THE COURT: All right. In other words, the
19 5200 Hertz line is too far to the right?

20 THE WITNESS: In the Olney chart.

21 Q Would you explain in terms of Chart A what the
22 lines drawn on the chart signify to you?

23 A The curves?

24 Q The frequency lines that --

25 A These signify to me that in both of these

1 zb-3 Martin-redirect

2 cases we are dealing with a quarter wave resonance type of
3 tube.

4 Q And why is that?

5 A Because the inner end of the acoustical tube is
6 meeting a high acoustical impedance.

7 Q I mean why do you draw the conclusion that it
8 is a quarter wave length type of tube?

9 A Oh, because calculations based upon the lengths
10 of the tubing involved using the velocity of sound and so
11 for this give you a quarter wave length at that approximate
12 frequency.

13 THE COURT: How did you determine the length
14 of all these tubes?

15 THE WITNESS: Well, in the case of Olney, the
16 check that I made was to see whether a quarter wave length
17 at 400 Hertz would be reasonable in view of the distance from
18 the ear to the mouth, taking into account the extra length
19 that is in the mouthpiece. I guess this is with the mouth-
20 piece also, wasn't it?

21 When I made a comparison of these different
22 devices for tube lengths, I did have that end. It wouldn't
23 apply in this case.

24 The data speak for themselves as far as the
25 location of a peak at 400 Hertz is concerned and --

zb-4

Martin-redirect

1 THE COURT: But in order to determine whether
2 that is a quarter wave peak or a half way peak, you have
3 to know the length or approximate length of Olney's tube,
4 don't you?

5 THE WITNESS: Not necessarily, your Honor. The
6 existence of only odd integer numbered peaks is a clear
7 indication of its being quarter wave. If it had been half
8 wave, we would have seen some peaks between these.
9

10 And, in fact, the first one would be at a higher
11 frequency than shown. I am sure that we are not making
12 a 2:1 error in our estimate of the tube length of Olney.

13 Q Assuming that the Olney was a half wave resonant
14 tube and the first peak was at 400 Hertz, where would the
15 next peak be?

16 A The next one would be at 800.

17 Q And then there would be one at 1200?

18 A 1200.

19 Q 1600?

20 A Right.

21 Q Would you turn to the first page of this exhibit
22 BBB and indicate what each of these properties on the
23 left represent and how they are compared in the Larkin patent
24 itself, which is the center column, and in the Olney patent
25 and here I note we are referring to the Larkin patent rather

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Martin-direct

2 than the paper, the Larkin paper which produced the graph
3 that is in Chart A.

4 A We searched for some of this information in
5 the Larkin paper and although it has some very beautiful
6 curves in it, some of the simple information like this didn't
7 have to be present in the paper.

8 Inside diameter -- these are all properties
9 that are related to the acoustical voice tube.

10 The inside diameter was not specified in the
11 Larkin patent. Olney specified 9 /64ths, which is about
12 .140 inches. The length was not specified in either case.
13 In both cases --

14 Q Just let me interrupt you. I note that the
15 length of the Larkin tube is specified in his paper but we
16 are not listing what is specified in the paper, is that
17 correct? This is a listing of what is in the patent?

18 A That is correct. The length that is given in
19 the paper is rather long. I can't reconcile that length
20 quite with the lengths of subsequent models, but I don't
21 think that is significant.

22 Q Would you continue in your comparison in terms
23 of the Larkin patent and the Olney patent?

24 A In both cases there was a thermoplastic material
25 used for the tube. I said thermoplastic, I am not certain

whether polypropylene is thermoplastic or not.

THE COURT: It is.

THE WITNESS: All right.

In both cases a single tube open ended is shown. No acoustic damping is shown in the Larkin patent and it is a major consideration in the Olney patent.

The adjustment is possible in each and is mentioned in both. Positioning in one case for Larkin is stated to be at the corner of the mouth. It is not stated in Olney but it is shown in the general region of the mouth in the diagrams.

Q How is the adjustment achieved?

A The adjustment?

Q Yes. Is it by sliding a tube up and back as in the current R70 and R71? I believe it is indicated on the chart.

A Oh, excuse me. Oh, it can be shaped to the person's face.

Q Is that true in both cases?

A Yes.

Q Would you continue?

A I believe I covered the positioning already. And the resonance characteristics is what I was just speaking about on the two graphs. The two charts.

zb-7

Martin-direct

Q Would you go back to Chart B and particularly Fig. 19 of the Olney patent. You have explained that one of those curves in that figure shows the system without damping so you can see the resonance peaks and the others with the damping present, is that correct?

A Yes.

Q Taking the one with the damping present, is that the microphone plus the tube attached?

A Yes. With acoustical damping at the termination.

Q And that achieves an ascending response with frequency?

A It has a rising response characteristic.

Q Would you refer to Fig. 20 and explain why he has designed that with an ascending response of frequency over a portion of the curve?

A Here he is showing the well-known fact that high frequency losses in cables are greater than low frequency losses and pointing out that the rising characteristic of the microphone can be complimentary to the high frequency losses in the cable.

Q Do you have any idea what the size of the voice tube is in the Dreher patent, which is behind Tab 4, or in the device that form the basis for that patent?

MR. ARNOLD: If it please the Court, I will

2 object to guesses. We seem to have had several guesses
3 that were off by a magnitude of two or three or four. If
4 you have information we would be glad to have it. I object
5 to a guess.

6 THE COURT: I think he is asking for informa-
7 tion, not guesses.

8 Q Do you have any basis for knowing what the size
9 of the voice tube is in the Dreher headset?

10 A Well, here in the courtroom this morning I
11 measured -- no, that isn't correct. That was another headset
12 I measured. Whenever I did it. I guess it was last night.
13 I measured the diameter of the voice tube on the model which
14 the co-inventor, Mr. Schwarzkopf, provided and there were
15 several tubes that were provided. The one that was on the
16 model had a diameter, I believe, about .08. I don't remember
17 to the second significant figure.

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Q Did you make any notes?

A Yes, I did. If I can refer to my notes --

THE COURT: Is this inside diameter?

THE WITNESS: Inside diameter, yes.

MR. ARNOLD: Inside diameter of what?

THE WITNESS: Of a voice tube on the Dreher model.

MR. ARNOLD: Where is this Dreher model?

MR. B. RADLEY: Here in the courtroom.

MR. ARNOLD: May we see it?

A The tube that was on the model was .075 plus or minus.

MR. BRADLEY: I might say we had no intention of relying on the model and the only reason we are making reference to it is the size of tubes has come up and I have asked Dr. Martin to measure these to see what they are.

Q I am sorry. I interrupted you, Dr. Martin.

A I think all I was going to add is I measured one of the other tubes and it was smaller than this. I misspoke a moment ago. I have just looked at my data again. The one that was on the model was .120 and the one that was with the model was .075 plus or minus five thousandths, say.

MR. ARNOLD: If your Honor please, I don't wish to waive objections that I might have and move to strike part of this on grounds of lack of authentication, but while

gwb-2

Martin-redirect

the witness is going forward subject to our proving authentication later, it might be desirable for you to see the tubes that are of those two sizes that the witness has just testified about.

THE WITNESS: Your Honor, while the end of this tube is somewhat damaged, it is easy to see that this tubing has an internal diameter of approximately .120.

THE COURT: Is there a ruler in the courtroom?
(Handed to the Court.)

THE COURT: Using the engineering scale and abutting the end of it against the portion of the inner wall which projects beyond the opposite side of the tube and reading it as closely as I can without a magnifying glass, it seems to me that the inside diameter is closer to about .140 thousandths. Maybe your eyes are better than mine.

MR. BRADLEY: I believe these were measured only with a ruler, your Honor, so there may indeed be some variation.

THE WITNESS: I would agree with your measurement, but point out that the tube is deformed somewhat and I think that the average diameter is -- in any case, I would be glad to accept .140.

THE COURT: The tube is deformed and that is why I measured it two different places and took an average.

gwb-3

Martin-redirect

At one place it looks like it is about .150 and another place a little less than .140, so I took .140 as an average of the two.

THE WITNESS: Here are the other tubes and they are of smaller diameter and I estimated one of them at .075.

THE COURT: I would say that is pretty close.

MR. BRADLEY: I am advised that one of the men has a pin gauge here. I am not sure your Honor wants to measure it that closely.

THE COURT: With the tube being distorted the way it is, I am not sure we can do much better.

MR. BRADLEY: I think we were only talking in terms of general numbers anyway.

THE WITNESS: That's right.

Trying to establish something a little better than the order of magnitude.

Q Do you know what the standard size tubing is for a hearing aid tube tip that would go into the ear?

A According to Lybarger's article, it has an internal diameter of .077 inches.

MR. BRADLEY: I have one such tip here and I don't purport that it is the average or standard. It just happened to be one that I have. So you can look and see what the relative sizes are between these tips from the

1 gwb-4

Martin-redirect

2 Dreher model and the tip from the hearing aid tubing. They
3 seem to be, in general terms anyway, about the same size.

4 Q Would you comment on that, Dr. Martin?

5 A Yes, they are very similar in size. I haven't
6 measured them to high precision.

7 Q Speaking of the small hearing aid piece of tube
8 that goes into the ear that I just showed you, do you know
9 whether the end of that is called a finial?

10 A I was not aware of the definition of finial until
11 the Court defined it for me.

12 THE COURT: I am not aware of its usage in the
13 hearing aid or headset field. I have seen it used quite
14 frequently in the interior decorating field and I am quite
15 sure if you walked into a lamp store and asked to buy a finial
16 they will produce very quickly one of those little brass
17 machine parts that screws onto the top of the lamp to hold
18 the lampshade on.

19 Q Using the definition as you understand it, Dr.
20 Martin, do you know whether that would be a finial or do
21 you feel unqualified to say?

22 A I feel unqualified to say. I haven't looked up
23 the definition of finial. The form of the word seems to
24 imply something at the end of something, and everything we
25 have mentioned as a possible finial fits that description.

App. 815

gwb-5

Martin-redirect

Q Before leaving the Dreher patent, let me ask you whetheryou have any opinion as to whether it would be usable in a communication system without depending in any way upon receiving sound from the internal ear canal?

A Yes, it would be usable with that qualification.

Q I have had parts of a M33 microphone cut up and one of the parts which appears to be a part of the voice tube I am going to introduce as an exhibit, Defendant's Exhibit CCC.

I will show you all of the parts together and ask you to comment on what they are.

MR. ARNOLD: We have no objection to the acceptance of the exhibit, your Honor.

(Defendant's Exhibit CCC was received in evidence.)

xxx

End 8A

APP. 816

1 8b am gwrf 1

Martin-redirect

2 Q The principal purpose of cutting this in half is to
3 get an idea of what the internal size is of the channel
4 through and also the sound ports into those channels, and
5 could you comment on that, please?

6 A Yes. If I may, I would like to show the Court,
7 since we were both taking a look at a similar device
8 yesterday.

9 Here are the two acoustical tubes in the M-33
10 microphone as viewed intermediate between their ends.
11 They are approximately 1/16 of an inch by 1/4 of an inch
12 in cross-section.

13 THE COURT: Have you measured them?

14 THE WITNESS: I believe I am depending upon a
15 drawing dimension.

16 THE COURT: Let's get the engineering ruler up
17 here again, if we can, please.

18 (Handed to Court.)

19 THE COURT: Just over a quarter of an inch in
20 length and just over 1/16 of an inch across.

21 THE WITNESS: If this rectangular cross-section
22 were replaced by an equivalent round cross-section, I
23 have calculated that the equivalent diameter of a round
24 tube would be approximately .140.

25 Q Dr. Martin, would you point out where the sound

1 gwrf 2 Martin-redirect

2 enters the tubes in that microphone M-33?

3 A Yes. There was some discussion of this yesterday.
4 Your Honor, you were looking at the termination piece here
5 which is added primarily to keep spit out of the microphone
6 cubes and to reduce wind noise from the mouth. The actual
7 openings into this acoustical tube are much smaller, I believe,
8 than you could see without this being removed. If one
9 calculates the combined area of these three holes, it is
10 rather close to the area of the tube itself. It is actually
11 smaller than that, but since these are so close together,
12 for sound the area of the triangle defined by these three
13 holes would really give a better approximation of what
14 its effective area is.

15 Q Dr. Martin, would you turn briefly to the
16 Pritchett Patent behind Tab 1 of Defendant's Exhibit C.

17 There was a reference to whether or not transducers
18 are included in the handsets in Figs. 1 and 2 of that patent
19 and I refer you to page 4 of the text, the first full
20 paragraph, and particularly the portion there that is
21 colored yellow, and would you read that and indicate what
22 you understand it to mean?

23 A This portion concerning Figure 1 is as follows:

24 "Supplied with or without soft iron cores and coils,
25 bobbins, and disks."

1 gwrf 3

Martin-redirect

2 These are typical parts from a magnetic
3 diaphragm type of receiver unit.

4 Q Do you understand that to mean or not to mean
5 a transducer?

6 A I understand that to mean a transducer, a magnetic
7 diaphragm type of transducer which was the most common
8 type for many years.

9 Q That may or may not be used?

10 A Yes. When I gave my answer on Figure 1 and Figure
11 2, I said that I had not checked the text of the patent
12 concerning transducers for these two figures.

13 Q There was reference to ear finials which we have
14 already discussed briefly, but no reference to Fig. 5.
15 I wonder if you would look at that figure and indicate whether
16 or not that shows an ear tube that goes into the ear canal?

17 A Yes, it does. Fig. 5 is a side view of Fig. 4
18 with several details that are different. The headband
19 has been omitted although it is referred to in the text.
20 The view tube is much longer in this case than in
21 Fig. 4.

22 Q In connection with losses in sound tubes, you
23 mentioned a 10 db loss. Were you referring to the
24 10 db loss in a tube when its size is changed or what was
25 that reference as to 10 db loss?

1 A The 10 db loss that has been mentioned more fre-
2 quently than its recollection justifies, really, was made on
3 a transducer held near the mouth and that same transducer
4 when mounted on the ear with a length of tubing. There
5 is more than the length of the tube and even more than the
6 diameter of the tube that is involved in this, as has been
7 discussed several times.
8

9 The size of the loss does depend somewhat upon
10 the transducer that is used as well as tube dimensions.

11 Q Did the 10 db have to do with the difference in
12 the size of the length or was it that particular tube you
13 were referring to?

14 A It was a result of adding a tube to the trans-
15 ducer in the manner in which they were coupled.

16 Q You talked about quarter wave resonances and half
17 wave resonances. Let me ask you whether you agree that
18 a tube cannot be an acoustical tube until it has the
19 resonance within a certain range of operation?

20 THE COURT: He has already said that a tube
21 doesn't have to have any resonance to be an acoustical tube.

22 MR. BRADLEY: I have no further questions.

23 MR. ARNOLD: If it please the Court, we will offer
24 in evidence as Plaintiff's Exhibit 146 the entire Dreher
25 model and its parts about which the witness has testified.

1
2 We regard it as a prime example of something
3 resurrected from dust covered heaps of ideas that never
4 matured to the public enjoyment of anybody.

5 MR. BRADLEY: I have no objection except to the
6 commentary.

7 (Plaintiff's Exhibit 146 received in
8 evidence.)

9 THE COURT: It will be received without the sur-
10 plusage.

11 MR. ARNOLD: We have no questions.

12 THE COURT: Thank you, Dr. Martin.

13 (Witness excused.)

14 THE COURT: It is now time to take our noon recess.
15 How do we stand with respect to our schedule?

16 MR. BRADLEY: Your Honor, I think we can maybe
17 come close. There are three witnesses left. I am sure we
18 will finish two and maybe the direct on the third.

19 THE COURT: I am willing to come back in exactly
20 one hour at 1:45 if you gentlemen can get out and get fed
21 and get back in that time.

22 MR. ARNOLD: We have been earing milk and
23 sandwiches in the courtroom several days. We will be here
24 as soon as your Honor gets back.

25 THE COURT: All right, 1:45, so the reporters will

1 gwrif 5a
2 have time to eat also.
3 (Luncheon recess.)
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2 AFTERNOON SESSION

3 1:45 p.m.

4 MR. BRADLEY: Defendant calls Mr. D'Agostino.

5 MR. ARNOLD: May it please the Court, Mr. Spragens
6 would like to leave in the middle of the afternoon and
7 Mr. Bradley said he does not plan to call him. If we
8 may, I would like Mr. Spragens to be free to leave around
9 3:00 o'clock without further interruption.

10 THE COURT: I have no objection if Mr. Bradley
11 hasn't.

12 MR. BRADLEY: I haven't.

13 M I C H A E L S A N T I D ' A G O S T I N O ,
14 called as a witness, being first duly sworn,
15 testified as follows:

16 DIRECT EXAMINATION

17 BY MR. BRADLEY:

18 Q Where do you live, Mr. D'Agostino?

19 A Staten Island, New York.

20 Q By whom are you employed?

21 A Roanwell Corporation.

22 Q That is the defendant in this case?

23 A Yes.

24 Q What position do you hold with Roanwell?

25 A Presently project engineer.

1 lzrf 2

D'Agostino-direct

642

2 Q Have you compiled any figures on the sales of
3 Roanwell R-70 and R-71 headsets to customers other than
4 Western Electric?

5 A Yes, I have.

6 Q Did you personally oversee the collection of the
7 data relevant to these sales?

8 A Yes, I did.

9 Q Did you check the figures as to their accuracy,
10 at least to the extent you felt it should be checked?

11 A Yes, sir.

12 Q Can you state what the figures are, please?

13 A Yes.

14 Q I would like a breakdown as between the R-70 sales
15 and the R-71 sales.

16 A For independent, that is nonWestern sales,
17 type 70, it was 855; for type 71, it was 4,886.

18 Q Would you state over what period of time that
19 covers?

20 A This covers a period between 1/26/71 and 12/9/74.

21 Q The last December?

22 A That is correct.

23 Q Did you also check to see how many customers
24 Roanwell have purchased either R-70s or R-71 headsets?

25 A Yes, I did.

2 Q What did you find in this regard?

3 A Out of a total of 37 organizations that purchased
4 headsets, I found that type 70s were purchased by
5 five organizations. Type 71s, 21 organizations and a
6 combination, 11 organizations.

7 Q You mentioned 37 organizations that purchased head-
8 sets. Are you limiting that to purchasing either the R-70
9 or R-71?

10 A No. Total organizations that purchased miniature
11 type headsets.

12 Q In other words, we are not talking about any other
13 headsets other than the R-70 and R-71, is that correct?

14 A Just the R-70 and R-71.

15 Q These 37, does that include Western Electric?

16 A No, it doesn't.

17 Q So would it be fair to say that it includes
18 all organizations that are purchasers of these other than
19 Western?

20 A Other than Western, correct.

21 MR. BRADLEY: I have no further questions.

22 CROSS EXAMINATION

23 BY MR. ARNOLD:

24 Q Mr. D'Agostino, have you a familiarity with the
25 difference in the marketing effort that has been directed

2 to Western Electric on the one hand and these other 37
3 organizations on the other?

4 A No, I don't.

5 Q The defendant in this case takes the position that
6 Western Electric enjoys a license to buy each product
7 at the same price and same delivery schedule and so forth
8 and the figures there show that Western, which has
9 this freedom of buying either one, buys substantially more
10 of the Model 70 than the Model 71, are you aware of that?

11 A Yes, I am.

12 Q Do you have any explanation as to the marketing
13 pressure that is brought as against these other people that
14 have no license as to which one they prefer? Do you have
15 any marketing information about that?

16 A No, I don't.

17 Q Earlier in the case we asked counsel for Roanwell
18 to provide us with accurate figures on the sales of the
19 Model 70 and the Model 71 and they told us they were not
20 available. Can you provide us any explanation as to why
21 that was so?

22 A At what point in time was this that you requested
23 this data?

24 Q Probably two years ago. I don't know exactly
25 when.

1
2 A At that time it was not available. I acquired
3 this information as a part of another assignment, separate
4 from these proceedings.

5 Q Where were the records stored from which you
6 prepared the figures that you just prepared?

7 A This information was derived from closed FOs.
8 That is factory orders. Factory orders that had been
9 completed and delivered to customers.

10 Q And where are they located?

11 A In our production control department.

12 Q In what town?

13 A In Manhattan, New York City.

14 Q What address?

15 A 180 Varick Street address.

16 MR. ARNOLD: May it please the Court, in view of
17 all the various circumstances, I would like -- and the
18 fact that there may be an accounting proceeding in due
19 course, I would like that all of the records which were used
20 in the preparation of Mr. D'Agostino's figures be ordered
21 to be preserved for our examination at such time as it seems
22 convenient when we reach that stage of the case.

23 MR. BRADLEY: Perfectly agreeable, your Honor.

24 THE COURT: All right.

25 MR. BRADLEY: I might mention that when we were

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D'Agostino-direct

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asked for these figures, it was really not a question
that we couldn't get them. I think it was a question of
burden and at that time we made an arrangement that, as
we discussed before, that we would assume that the sales
were on the same ratio as Western.

1 MR. ARNOLD: I think I should stand correct.
2
3 I used the words couldn't get them, and I think the point
4 was couldn't be gotten without any reasonable burden.

5 Your correction is correct and I should not
6 have misstated that.

7 MR. BRADLEY: I am not trying to be picky on it.
8 I am just saying that we made an arrangement then and we
9 later found out it was incorrect and as I mentioned to the
10 Court before, we apologized that we produced this mater^T
11 at such a late date.

12 THE COURT: Let me ask you this, Mr. Arnold.
13 Do I understand you to say Western Electric has a license
14 to buy the R70 and the R71 type headsets from any source?

15 MR. ARNOLD: It is the defendant's position
16 that they do. It is our position that they do not. The
17 situation arose that in consideration for our right to,
18 for Plantronics and Roanwell's right to bid for the contract
19 to make the 61, Western Electric required an exchange, a
20 cross license under all developments of a certain broad
21 definition.

22 We didn't get the contract. We don't think
23 they have a license from us, but the defendant has taken
24 the position that they do have a license from us which will
25 become relevant at the time of the accounting.

1 zb-2

D'Agostino-cross

2 So the defendant's position is, Western Electric
3 is immune. Our position is Western Electric is not
4 immune.

5 THE COURT: All right.

6 Let me ask you this, Mr. D'Agostino. How long
7 has the R70 been on the market or stated a different way,
8 when was your first shipment of a R70 headset that was
9 commercially sold?

10 THE WITNESS: The only thing I can go by is the
11 first date that I have on this as far as it being January
12 of '71. More accurately than that I couldn't be.

13 THE COURT: So the period which you checked,
14 that is, January '71 to December 1974, was a period during
15 which both the R70 and the R71 were on the market together?

16 THE WITNESS: Correct.

17 THE COURT: All right.

18 MR. ARNOLD: Let me be sure one other point is
19 clear, if I may, your Honor.

20 Q Is it not true that the R70 and the R71 came
21 out together at the same price?

22 A I don't know that for a fact.

23 MR. ARNOLD: No further questions.

24 THE COURT: Thank you, Mr. D'Agostino.

25 (Witness excused.)

zb-3

Hutchings-direct

MR. BRADLEY: The defendant calls Mr. Hutchings

Your Honor, we plan to question Mr. Hutchings under Rule 43B, as an adverse party or an adverse witness

MR. ARNOLD: We accept the consideration that he is an adverse witness, your Honor.

THE COURT: All right.

K E N N E T H J A M E S H U T C H I N G S, called

as a witness by the defense, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BRADLEY:

Q Where do you live, Mr. Hutchings?

A In Chula Vista, California.

Q Are you the inventor named in the Hutchings patents in suit?

A I am.

Q Are you also the inventor named in the Hutchings Patent 3,601,841?

A I don't know the numbers. Which is this?

Q I am about to hand you a copy.

A Yes.

Q Are you currently employed by the plaintiff Plantronics?

A Yes.

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Hutchings-direct

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Q What is your position there?

A I am manufacturing engineering manager in our plant in Mexico, which is called Phame, S.A.

Q How long have you been employed by Plantronics?

A Since 1967, I believe.

Q Did you have any prior experience in headsets before joining Plantronics?

A No.

Q Had you previously worked in hearing aids?

A Yes. But the type you put in your pocket, not the mounted on the head type.

Q Had you previously designed any hearing aids?

A Yes.

Q Would that be one or more than one or do you recall?

A Two.

Q For what position were you hired by the plaintiff?

A By whom?

Q By Plantronics.

THE COURT: The plaintiff.

A I can't remember my original title. Design engineer, something like that.

Q I would like to hand you three exhibits which

zb-5

Hutchings-direct

we have marked Defendant's Exhibits CC, DD and EE, and you will recognize that EE are some notebook pages of yours that were produced for us.

A Right.

Q The CC and DD are two books of drawings.

A Yes, sir.

Q Book CC we have marked as drawings of units with the mike and receiver outlets, both over the top, both at the top, I should say.

A Right.

Q And DD we marked as the mike outlet at the top and the receiver outlet at the bottom.

I wonder if you would check Exhibit CC and see if all the drawings in that are as so described?

A Well, there is one here that isn't. This one here is a drawing of a hearing aid case. It doesn't have a mike outlet.

Q In other words, on the first page, toward the left, there is an actual hearing aid case there?

A That is, I believe, the --

THE COURT: Audiotone

THE WITNESS: Audiotone hearing aid case that I took some dimensions on to find the inside curve of the case.

Q Was that in connection with the same project?

1 zb-6 Hutchings-direct

2 A Right.

3 Q And then as far as the actual headsets that
4 are shown in these pages, are they all of the type where
5 the --

6 A They all have the -- just a minute -- yes, they
7 all have the mike and the receive tube out of the top except
8 for one little detail down here which is a ball joint detail.

9 Q In other words, I have numbered these pages
10 so that on Page 5--

11 A The right-hand side.

12 Q There is a ball joint and what is that generic
13 to any type or is that for some other type?

14 A That was just a few thoughts on how to do a ball
15 joint.

16 Q So in other words, all of the headsets that are in
17 this defendant's Exhibit CC are headsets with both tubes over
18 the ear, is that correct?

19 A Right.

20 Q And just to complete it, then, would you look
21 at DD and also see whether all of the headsets in that book
22 are ones with the voice tube over the top and the ear tube
23 under the bottom of the ear?

24 A There is one view here on Page 4 that I can't
25 see which it is. There just isn't enough detail there,

App. 834

1 zb-7

Hutchings-direct

2 but as it is adjacent to this one, it may be but I can't
3 tell that.

4 Q Where does that appear on Page 4?

5 A All you can see is just the line that goes around
6 by the ear. It is the top part.

7 Q The top half of the page looking at the page
8 sideways?

9 A Right. There is another one here that doesn't
10 actually show where the outlets are, but from the drawing
11 I know what I intended, and that was outlet top and bottom.

End 1B

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App. 835

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Q What page is that?

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A That is 7.

4

Q The others all check?

5

A Yes.

6

Q I might mention for your information, Mr.

7

Hutchings, I tried to include in these all the drawings that

8

were supplied to me in date order, but --

9

A Having broken them apart, they won't be in

10

date order. It doesn't follow that because both

11

the tubes over the ear in this and that one tube goes over the

12

ear in this that they follow on in date order. They will

13

be interleaved.

14

Q What I meant is I have arranged it so that all

15

the drawings in book CC follow each other in date order.

16

A Right.

17

Q And then all the ones --

18

A But this doesn't necessary follow this or

19

this doesn't necessarily follow that.

20

Q So CC or DD could be interleaved?

21

A Right.

22

Q The other thing I was going to mention for your

23

information, there were a few additional drawings I had of

24

the tubes, one over the top and one under the bottom, which

25

had no date on them so I couldn't place them anywhere, so

1 gwb-2

Hutchings-direct

2 those are not included, but as far as I know these include
3 all the ones dated.

4 I would like to follow these through for a moment
5 and I refer you to your notebook page 71 and starting at the
6 top of the page it says --

7 THE COURT: Is that notebook an exhibit number?

8 MR. BRADLEY: It is Exhibit EE.

9 THE COURT: All right.

10 Q The first page is Page 71. Starting at the
11 top of the page, it says "Started work Monday, 23 December,
12 1968, to lay out concept of a post-aurical-type headset."

13 Do you see that, Mr. Hutchings?

14 A Yes.

15 Q That is the same as we called behind the ear,
16 is that correct?

17 A Correct.

18 Q "Provisional layouts completed December 30,
19 1968, indicated that a full size receiver and half size micro-
20 phone would fit in the space and shape envisioned." The
21 half size microphone, that would be half the size of the
22 receiver?

23 A The receiver is 3/8 of an inch square and the
24 microphone was something less than 3/8 of an inch in one
25 dimension, but 3/8 of an inch in the other dimension. It

1 may not be exactly half, but it is approximately cut in half after
2 on a 3/8 square dimension.

3
4 THE COURT: If I might interrupt, Mr. Bradley,
5 so I don't go rummaging through this big pile of exhibits
6 to find the right one, can you place the date of this entry
7 January 13, 1969, with or in relation to the date of the
8 sales department's request for a me-too product?

9 MR. JANICKE: It is the other company.

10 THE COURT: Excuse me. I am sorry. I keep for-
11 getting. You are examining an adverse witness here and
12 these are Plantronics' notes.

13 MR. BRADLEY: The activity of Roanwell started
14 toward the middle of the year, your Honor. This is the
15 beginning of the same year.

16 THE COURT: All right.

17 Q So the provisional layouts, then, being on
18 December 30, 1968, and it appears that would refer to what
19 is Drawing 1 in the Book CC, is that correct?

20 A It refers to -- yes, Drawing 1, except for the other
21 half of the drawing which I have already pointed out is
22 not part of it.

23 Q In other words, the Audotone hearing aid on the
24 left is the same drawing?

25 A Yes.

gwb-4

Hutchings-direct

Q And you utilized that to get the internal curvature of the shape that you were drawing over the right-hand side of the page, is that correct?

A Yes, I had not all at once, but I got hold of three hearing aid cases, one was a complete hearing aid, one was the Audiotone we bought some Maico cases, and we bought the Oticon hearing aid, and to get an idea of what the shape was behind the ears, both the curve behind the ear and the hook over the ear, I took some dimensions off of them and I made little sketches like this to show what they were.

They are all practically identical.

Q And the next sentence says:

"The concept of the mike and receiver ports emanating from the top of the ear was pursued until January 2, 1969."

And I see that the second and third pages of Defendant Exhibit CC are both dated January 2, 1969, is that correct?

A Yes.

Q So up until that date and on that date you were still making drawings of the two ports and the two tubes over the ear, is that correct?

A Yes.

1 gwb-5

Hutchings-direct

2 Q Now the next sentence says:

3 "The concept of the mike outlet over the ear
4 and the receiver outlet under the ear was then evaluated
5 and a layout completed January 4, 1969."

6 Of course that would carry us to Exhibit DD and
7 that appears to refer to the first drawing in that book which
8 is in fact dated January 4, is that correct?

9 A Yes.

10 Q Do you know who suggested that this concept then
11 be evaluated? Was that a suggestion somebody made to you?

12 A No. I got a model made. Nobody suggested that
13 I should do it.

14 Q In other words, on January 4 you decided then
15 to evaluate this approach rather than someone directing
16 you to do so at that time, is that correct?

17 A I was project engineer on the job and I did what
18 I thought I should do.

19 End 2A

20

21

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1 2b pm gwr 1

Hutchings-direct

2 Q I believe you testified in depositions that the
3 date January 4th was in fact your date of conception of
4 this design with the tube or port at the top and the tube or
5 port at the bottom, is that correct?

6 A Yes. I have got it dated the 4th. I might have
7 started it on the 3rd, but as long as it takes the drawing.

8 Q Was this drawing that is dated January 4th the
9 first drawing that you made of this type of configuration?

10 A Yes, to my knowledge, yes. It is the only one
11 I can remember.

12 Q Do you know whether you made other rough sketches
13 first or was this --

14 A It looks as if the view on the left is a sort of
15 rough go at it and then a better go at it in the view on the
16 right.

17 Q So as far as you now recall, this is where you first
18 laid pencil to paper to make a sketch of this approach?

19 A Of this type, yes.

20 Q I notice this time that you had already made of
21 course three drawings of the other type which are pages 1,
22 2 and 3 of Exhibit CC.

23 A Yes.

24 Q All of these drawings had the microphone, which
25 would be the smaller of the two, near the top and the

1 gwrf 2 Hutchings-direct

2 receiver in the bottom of the case, is that right?

3 A Right.

4 Q And so taking both tubes out the top you would
5 have to run the receiver tube all the way up through
6 the case past the mike and alongside the microphone tube
7 and then down into the ear, is that right?

8 A That is shown in one of the drawings, I believe.
9 It shows the two tubes coming out the top and page 1 with
10 what would be the tube that goes through the headset, the
11 start of it, anyhow, at the top.

12 Q It shows on page 6 quite clearly, doesn't it?

13 A It is shown partially on page 3, too.

14 Q Right.

15 Did you envision problems of intercoupling be-
16 tween the two tubes running alongside each other in the
17 configuration?

18 A We were using -- well, the idea was to use a
19 rubber tube on the microphone port and the receiver port --
20 these are the little tubes that stick out from the
21 transducers. And to lay those tubes in there and close the
22 capsul down, it could have proved a production problem.
23 You may squeeze a tube and then you have got your output
24 or your input, one of the two.

25 THE COURT: The question is whether there would

1 gwrfr 3 Hutchings-direct

2 be a problem with intercoupling.

3 Q A feedback type problem between the two channels,
4 acoustic channels.

5 A At this stage I was more interested in the mechanical
6 problems.

7 Q Did you envision a problem of having the two tubes
8 come out next to each other over the ear as far as people
9 who wear glasses?

10 A Yes, there are more problems than that to bring
11 the two tubes over the top.

12 Q What are those problems?

13 A One of them is that, particularly if you look
14 at the first idea, the first piece that was put down on
15 paper with the little neck coming down from the microphone,
16 the idea was a tube with a tip on it together on to there and
17 it is so short that you would have to custom fit every-
18 body and the chances of the kinking are very great.

19 The tube isn't long enough to take into account
20 any variations in the ear. So this sort of immediately
21 puts this out of court. So you don't see this any more.
22 At least I don't think you see this any more. Yes, there
23 is one here.

24 Q This one with the configuration with the two
25 tubes at the top is the one in which you obtained a second

1 gwrf 4 Hutchings-direct
2 patent I referred to originally as what we can call the
3 '841 patent?

4 A Right.

5 Q In the statement I read from the notebook it says
6 the concept of taking the mike out over the ear and
7 the receiver under the ear was then evaluated.

8 It seems as though you might be suggesting that
9 that was a routine next step. Did you view it that way?

10 A Yes. I haven't made up my mind yet which way to
11 go. I am trying different things. I get very difficult
12 to live with after I make up my mind which way I am going.
13 Then I don't listen very well to possible suggestions of
14 doing it other ways. But I have got a fairly open
15 mind at this stage. I am trying different ways.

16 Q Was this a routine type of development effort where
17 you tried one and then the next step as a routine?

18 A I wouldn't say it was so routine. It seemed to
19 suggest that this is the thing to do on this particular job.

20 Q Would you think it would be the -- I am not
21 trying to put words in your mouth -- would you think it
22 would be the logical thing if you ran into these problems
23 with the two tubes coming up, one all the way from the
24 bottom to the top, to separate them and take it out the
25 bottom?

1 A I don't know whether it is logical or not, but
2 it is the way I went.

3 Q I would like to stick with the Exhibit DD for a
4 moment and follow through the development on that.

5 We said that page 1 was the first sketch you had
6 made on it.

7 A Right.

8 Q And then page 2 seems to show the case itself or,
9 rather, the interior and it has some dimensions on the
10 case. Are 1 and 2 otherwise the same except 1 is the outside
11 of the case and the other is a cross-section of the inside?

12 A Not necessarily the same. This is a rough sketch
13 and here I am placing dimensions on it.

14 So there might be minor differences. This is
15 to make solid model No. 1, to make a solid model out of a
16 piece of plastic so we could put it on the ear and try it.

17 Q In other words, No. 2 is a more formal drawing
18 to have something made from it but I don't see any substantial
19 changes in what I would call configuration.

20 A No, there is nothing substantial, but there
21 may be detail changes.

22 Q Now going from No. 2 to No. 3, that again is
23 the same as No. 2. I think the drawing shows some details
24 over the ear that are different. All of the details are
25

essentially as on page 2, is that correct?

A Yes. I think if you refer to the notes you will find the reason for that.

Q I'm sorry. I couldn't quite hear you.

A If you refer to my notebook page, you will see the reason for that. It says here, "The model was completed 1/7/69 but it was not correct in some of the details of the shape over the ear."

There was a slight correction in some of the detail over the ear, so we made another model.

2 Q I notice the part that would stick forward toward
3 what would be the voice tube is a little bit elongated
4 beyond what it was --

5 A This is a sort of subsidiary thought coming in,
6 how are we going to attach a tube, a voice tube, so I
7 have allowed a little more meat on there to attach, to do
8 some attachment.

9 Q I wondered whether that was for a bayonet
10 connection type attachment.

11 A That is how you would attach the voice tube.
12 That is what I'm saying, I've allowed some meat there to
13 form an attachment for the tube.

14 Q But otherwise -- I'm trying to find the similarities
15 and differences. Otherwise the drawings 2 and 3 would be
16 the same, is that correct, except for the things you have
17 already explained?

18 A It looks as though I may have changed the
19 diameter of the nose. On item 2 there is a diameter of
20 .218, seven thirty seconds, .218. On the left-hand view
21 of the top. The first dimension.

22 Q What did you call that, the nose?

23 A The nose, the piece that comes out of the ear. Her
24 is 209. I have changed it by a few thousandths.

25 THE COURT: You also changed the diameter of that

1 piece that extends out of the nose?

2 THE WITNESS: That is the piece I am talking about.

3 THE COURT: You changed also the diameter of the
4 plastic piece out of which it extends.

5 Q The tubular portion that extends out of the
6 nose.

7 THE COURT: It is .100 on page 2 and it is .072
8 on page 3.

9 THE WITNESS: Yes, that is correct, your Honor.
10 There is a couple of little changes plus a little bit of
11 extension on the nose.

12 Q Would you turn to the page 4 --

13 A The same book?

14 Q The same book, yes. And at the same time would
15 you take a look at page 72 on the notebook which is
16 Exhibit EE. At the bottom of the page there it speaks about
17 the feasibility of a plug-in capsul cable was commenced
18 with discussions and so forth.

19 A Right.

20 Q Then it says layout work was commenced on the cable
21 entry January 11, 1969, is that correct?

22 A To the best of my knowledge. I don't have a
23 drawing.

24 Q No, I mean I read that correctly?

2 A Yes.

3 Q From the appearance of the first three drawings,
4 I would assume that there was no plug-in connector in the
5 first three drawings, is that correct --

6 A There was nothing specifically finalized, no.
7 There is a space for it. I have left space for it and
8 the projection from the back on drawings 3 and 2 are where
9 the connector would be.

10 In other words, the step on the back there is
11 where the cable would emanate.

12 Q Would that be a plug-in connector at that point
13 or would that be just a cord going in?

14 A This was one of the things I was determined to
15 do, have a plug-in connector.

16 Q So now on page 4 you actually lay out the plug-in
17 connector, is that correct?

18 A Yes. This is a first go at it.

19 Q And so again comparing one drawing with the other,
20 starting with the page 1, comparing with page 4, the basic
21 changes are the dimensions over the ear that we have dis-
22 cussed and you have now gone to this plug-in connector,
23 is that correct?

24 A Yes. Really, there are no basic changes.
25 There are some minor changes.

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Q Let's jump over for the moment to page 8 and it shows some dimensions there as to the areas inside the case.

A Yes.

Q And I think this is what you referred to as the microphone being .3 by .390 and the receiver at the bottom being .450 square, is that correct?

A That is not the receiver or the mike dimension. It is the cavity in which the receiver and the mike plus a boot go.

Q That is what I meant to indicate, it is a cavity for the --

A Right.

Q It would include not only the transducer but also --

A The anti-shock mounting boot.

Q But the reason for the different dimensions of the two is because of what we discussed before, that it is a half size mike, is that correct?

A Right.

Q Now again comparing 8 with Fig. 1, is that basically the same?

A It is basically the same. A few minor detail changes. That is why you redraw it, because you would want to change a little detail.

2 Q I would like to look at page 9.

3 A Yes.

4 Q Here you have two side by side drawings and I note
5 this page is dated April 18th, so that apparently there was
6 some thought at this point of dropping the idea of using a
7 half size mike and going to a full size mike, is that
8 correct?

9 A Yes. It is a wonder these two drawings are so
10 good because I was quite upset when they changed from the
11 half size mike to the full size mike. Quite a traumatic
12 experience when you have gone so far to find they will change
13 everything now.

14 Q Is that the purport of these drawings, that
15 you are redoing it to include the larger mike?

16 A Yes. This was a management decision that we
17 should carry on to -- carry on using the same transducers
18 in the new headset as we did in the old one, the old headset,
19 so that we could have the same transducers for both headsets.

20 Q This is the first drawing we have seen so far in
21 this book, we skipped over a couple of them which I didn't
22 think added very much, and I didn't want you to ignore those
23 but this is the first one in the book that includes this
24 change. Is that right?

25 A Right.

Q That would be in the middle of April approximately.

The affect of this is that you, it appears from the drawing on the left that you extended some lines out and in so doing left enough room or made enough room to fit the mike in?

A I changed the shape of the capsule.

Q Both your microphone and receiver at this point were square in shape?

A Yes, both the same size.

Q But I mean the configuration of them was square rather than round, is that correct?

A Yes. Both square but the -- there is a difference in that the port on the microphone comes out of the center of one side and the port on the receiver comes out one of the corners.

So that the orientation in the capsule has to be different to account for this.

Q Yes. The receiver here is shown at the bottom.

A Right.

Q Is that correct, looking at, for example, the right-hand side of page 9. It had the port for the receiver at its lower left-hand corner, is that correct?

A Right. It is on the corner of the receiver.

Q And it is laid out so that meets with the ear tube

2 that comes out?

3 A You will notice on the drawing there, there is a
4 little metal nipple that drops into the molding.

5 Q Yes.

6 A And then the rubber tubing passes through that.

7 Q On the top the mike apparently had the port to it
8 in the middle on the left-hand side.

9 A Right.

10 Q That would mate with the voice tube which went out
11 over the ear?

12 A Right.

13 Q Going back to your notebook, which is Defendant's
14 Exhibit EE, on the top of page 73 it states, "Decision
15 made to pursue the concept with the mike outlet over ear
16 and ear tip outlet under ear. Do you see that?

17 A Yes.

18 Q That is dated January 14, 1969, so at this point
19 apparently there was a decision made that instead of going
20 with the two tubes at the top, you would have one at the top
21 and one at the bottom and more specifically the voice tube
22 at the top?

23 A Yes.

24 Q Do you recall why this decision was made?

25 A I liked that way of going better.

Q Was it your decision?

A Oh, yes.

Q Mr. Hutchings, I hand you a copy of Defendant's Exhibit FF which are the notes of an engineering meeting on December 21, 1968 and your name is indicated as being in attendance at that meeting. Do you recall the meeting?

A Yes.

Q At the outset on the top of the page it states "Examination of hearing Aids" and then under that it says "Types seen at Santa Cruz," and it lists various ones including post-auricle.

Can you explain what that has reference to?

A Yes, the four of us, myself, Parker, Bernardi and Schomberg went out to the town of Santa Cruz and we went to two hearing aid dealers so we could have a look and see what was being done from the point of view of the various types.

One of the things we were interested in was eartips, the type of tip that goes into the ear. There is a lot of work to be done in this area. When we saw several different types of eartips, we also looked at different types of hearing aids and this is what it says here, "Ear aid in the ear." This was a hearing aid -- the whole thing went right in the ear, a tiny little thing.

Post-auricle, behind the ear bone conduction which is general
a behind-the-ear device operating on the mastoid bone.

There were glasses, frame types and item 6 I'm
afraid cord type, I can't quite recall what that is.

Q Do you recall whether you saw the Oticon hearing
aid at that time?

A No.

Q You do not recall or you--

A We didn't see it then. That was purchased later
when the -- it says follow up, go up to San Francisco.

Q Yes.

A I didn't go on that trip but that is when Mr.
Graham, Mr. Parker and I forget who else went to San Francisco
but they came back with an Oticon hearing aid.

THE COURT: Might a cord type be the kind where
the works is contained in your pocket and there is a cord
that extends to the hearing --

THE WITNESS: This is quite possible, your
Honor. It definitely doesn't ring a bell with me.

Q Was the Oticon hearing aid delivered to you by
whoever purchased it?

A Yes.

Q In one of the answers to interrogatories, it
indicates that by January 6, 1969 you had obtained an

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673a

Oticon hearing aid.

A I'm not sure of the date.

Q Do you know whether it would be approximately
that time?

A What was the date you said, January the 6th?

2

Q Well, it is January 6.

3

A It is quite possible it could have been by then yes, because this meeting was December 21st and it was not many days later that they went up to San Francisco.

6

Q On your trip to -- the one you went on to Santa Cruz, did you see any other hearing aids where you had both the port and the receiver -- the microphone port and the receiver port on top of the hearing aid?

10

A Not to my knowledge. We were looking basically at shapes, not where the pieces were. We were not in detail yet. We were sort of looking for approaches.

13

Q You don't recall seeing any of that type on the trip, is that right?

15

A No. I don't think so, no.

16

Q Do you recall seeing any behind the ear hearing aids, and of course my last question had reference to behind the ear hearing aids.

19

A I appreciate that.

20

Q Did you see any behind the ear hearing aids which had the microphone port at the top and the receive port at the bottom?

23

A Once again, I can't remember, but I don't think so. This wasn't the sort of thing we were looking at at that time.

25

zb-2

Hutchings-direct

Q Do you know whether you have ever seen a hearing aid with a receive tube at the bottom and a microphone tube or port at the top?

A I don't think I have seen a hearing aid that way, no. I have seen them with both at the top. My hindsight is 20/20 now. I know a lot of hearing aids.

Q I believe you mentioned that the internal shape on your headset was taken in -- in depositions, was taken, in part, from the Oticon.

A In deposition I said from three hearing aids.

Q I am not trying to misquote you. I am trying to get that straight. Was it from --

A From three hearing aids and it was the -- the one I used was the Audotone, but as I say there is so little difference in them, basically the difference between the Audiotone and the Oticon was the inside radius was one inch and the other one is one and one-sixteenth.

Q Looking further at Exhibit FF, in Paragraph 3D, and 4A, there is reference to a 61A type and also there seems to be a handwritten note there or get 61A from Bell, does that refer to the 61A hearing aid that there has been some -- I am sorry, headset that there has been some reference to in this suit?

A It would be the Bell headset, yes. I think at

zb-3

Hutchings-direct

1 this time we had had a Bell headset -- I think this was
2 after we did the bid on the Bell headset so we had it in. We
3 had seen it.

4
5 Q Was the 61A effort by Bell what projected this
6 problem or this project at Plantronics?

7 A You bet it was. This was our only product. The
8 headsets were our only product and Bell was about 80
9 per cent of our customer requirements, our sales.

10 Q In the final product, the StarSet, was any part
11 of it taken from the 61A?

12 A The acoustic tube is of a similar -- it is
13 not the same. The dimensions are slightly different to match
14 our particular acoustic path.

15 Q Would that -- excuse me.

16 A There is a point here. Our headset previously
17 had been the MS50 which mounted on the spectacle frame or on
18 a headband. When you have this configuration, you can move
19 the headset to make the -- to bring the point of the tube
20 adjacent to the mouth, but when you hang a headset on your
21 ear, there is nothing you can do except have an adjustable
22 tube. It has to be adjustable angularly and it has got to
23 telescope. This isn't necessary if you will not mount it on
24 the ear, but if you mount it on a headband or eyeglasses, you
25 can move the headset.

zb-4

Hutchings-direct

As soon as you hang it on the ear you can't so you have to make other provisions.

Q Would your voice tube that you were referring to as being very similar to the 61, would that include the wire mill part at the front edge of it?

A No, the puff shield, no. We didn't use a puff shield. We used a different method. We got our ferrule on the end of the tube and in the end of the tube, of course, there is the acoustical resistance which has to be there to compensate for varying lengths of the tube, but we have a ferrule on the end of the tube which has a reversed radius going in and our acoustic expert tells me that this is very similar, has a similar effect to a puff shield, the wire.

Q How about the sintered disc that provides the acoustic damping?

A We have a cylinder. Not a disc.

Q Going back to the notes at the engineering meeting, in Paragraph 3 --

A Which page is this?

Q This is till Page 1, FF.

A Okay.

Q Paragraph 3A refers to Hutchings making layout of 2A and 2B refers back to the post-auricle or behind the

1 zb-5 Hutchings-direct

2 ear.

3 A Right.

4 Q Why was this particular configuration assigned to
5 you, and you know?

6 A The whole project was mine to come up with a
7 headset. And I was -- I was actually drawing it out
8 then. I had assistance from Bernardi, who was the acoustics
9 and electronics man and I had assistance from Fred Parker,
10 who was the chief manufacturing engineer and he was sort of
11 running interference, keeping people out of the way and if
12 had something I wanted to know, I wanted to get some tubing
13 or something like this, he took care of this.

14 Q And now two days after that meeting, which to me
15 was December 21, and two days later your notebook indicates
16 that you started then with the work that we have already
17 discussed on December 23, is that correct?

18 A Yes.

19 Q And the one we talked about, two designs you laid
20 out, one with both tubes over the ear and the other with
21 the voice tube at the top and the ear tube at the bottom?

22 A Right.

23 Q Were there other configurations that you also
24 laid out during that time?

25 A I don't think so. We were fairly -- I was very

1 zb-6 Hutchings-direct

2 definite about anything I did around that time, signing it,
3 getting it witnessed. If you got all the witnessed drawings
4 here, you got everything.

5 Q You didn't, then, try having the voice tube at the
6 bottom and the ear tube at the top?

7 A No.

8 Q So you didn't make any comparative analyses
9 between those two?

10 A I considered that to be a basic design concept
11 error.

12 Q You say you did consider it or you didn't con-
13 sider it?

14 A I considered it to be a basic design concept
15 error.

16 Q So in other words, you were aware of that
17 approach at the time but you didn't follow it, is that

18 A Yes.

19 Q You disagreed with the approach?

20 A Yes.

21 Q Were you aware at that time of the Flygstad pat-
22 ent?

23 A No.

24 Q You apparently know the Flygstad patent I
25 have reference to --

1 zb-7

Hutchings-direct

2 A I dream about it.

3 Q At this time, which would be late 1968 or early
4 1969, it was known, was it not, that you could convert a
5 behind the ear hearing aid to a behind the ear headset?

6 A I don't know whether it was known, but I did it.

7 Q I mean prior to the time of your work?

8 A I don't think so. I don't know that anybody
9 had done it.

10 Q Hadn't the Plantronics done it before by convert-
11 ing an Audotone model 77 to a headset?

12 A No. I didn't know about the MS43. I found
13 out about that later on.

14 Q The MS43 was with the voice tube at the bottom
15 and the ear tube at the top, was it not?

16 A Right.

17 Q I have a hearing aid case here which is Defendant
18 Exhibit K2, and which is marked and stamped. It is an Audotone
19 Model 77 hearing aid, and I wonder if you would take a look
20 at that and indicate where the ear tube comes out and
21 where the voice tube comes out?

22 A The ear tube comes out over the ear and it
23 looks to me as if that might be the microphone.

24 Q I shouldn't call it a voice tube. It
25 actually doesn't have a tube. It just has a microphone --

1 zb-8

Hutchings-direct

2 A It has a port and it has a puff shield on it.

3 Q So the receiver is at the top of the case with
4 a receiver tube at the top over the ear?

5 A Right.

6 Q And the microphone is at the bottom of the case
7 with a microphone port at the bottom, in this case it is --

8 A At the back.

9 Q I meant the lower half of the case, it is facing
10 back.

11 A Right.

12 Q Now, if you had known that someone took an
13 Audiotone Model 77 and converted it to a headset by putting
14 an ear tube at the top and a voice tube at the bottom from
15 the respective receiver and the microphone, don't you think
16 it would have been obvious that you could get a different
17 hearing aid, for example, one with the hearing tube at
18 the top and the voice port or tube at the top also? And
19 just put the voice tube onto that?

20 A Well, all I can say is in hindsight vision
21 is 20/20. When you are trying to do these things and you
22 don't have this to go on, it is not that easy.

23 Q But do you have a feeling as to whether or not
24 it would have been obvious to you if you had this in front
25 of you at the time? That is sort of the question we have to

1 zb-9

Hutchings-direct

2 ask here.

3 MR. ARNOLD: I am happy for the witness to
4 answer, but of course what was obvious to the inventor is
5 not relevant to the issue in the case.

6 THE COURT: You are saying that, I suppose,
7 on the assumption he is not a man of ordinary skill in the
8 art.

9 MR. ARNOLD: Well, I think that that is perhaps
10 correct. The point is that every time there is an invention
11 there is something that has some time occurred to the inventor
12 and the fact that he visualizes it is not evidence of what is
13 obvious to a man of ordinary skill in the art within the
14 statutory standard.

15 THE COURT: I think the operative word was ob-
16 vious. If it was obvious to him, perhaps that is relevant
17 on the question of validity. If he thought of it, that
18 doesn't necessarily mean it was obvious.

19 THE WITNESS: Would you like to come again?

1 3B

A-PM

1 GWL Hutchings-direct

2 Q Let me withdraw that question and say if you
3 had the hearing aid or a headset made up of the Audiotone
4 Model 7 which I am now holding up and it was a headset
5 where the internal works were re-wired and the ear tube
6 was over the top and the voice tube was down at the bottom
7 to convert that into a headset, wouldn't it be perfectly
8 clear that if you had a different hearing aid with the two
9 tubes at the top you could equally well bring out the micro-
10 phone tube to the mouth and make a headset from it?

11 A Yes. That is why I said I did it.

12 Q How about if the microphone tube were at the
13 bottom and the hearing tube at the top?

14 A Then it would take a little longer because it
15 would take me a while to find out, if I did this, that it
16 wasn't very stable.

17 Q I am sorry. What I meant was instead of taking
18 this one which somebody else had done in MS-43, if you had
19 one, and I think you may have indicated you never did see
20 one which had the voice tube at the top and the hearing tube
21 at the bottom.

22 A Not the MS-43, no.

23 Q Instead of having this one I am holding, the Audioton
24 77, if you had a hearing aid case which did have a voice
25 port, a voice tube at the top and the ear tube at the bottom,
wouldn't it then also be perfectly obvious that you could

1 GW2 Hutchings-direct

2 convert that by the same inter-wiring as on the Audiotone 77
3 and by bring that voice tube out to the mouth?

4 A Well, maybe not obvious but maybe with a bit
5 of work, yes.

6 THE COURT: Was there such a hearing aid, Mr.
7 Bradley, in existence in 1965?

8 MR. BRADLEY: It is my understanding, and I am
9 not sure about this, that a hearing aid of that type has
10 never been on the market. We have a prior art reference
11 which shows it in the literature and that's in Defendant's
12 Exhibit K-1, for your Honor's information, behind tab 7.

13 Q Mr. Hutchings, did you consider at the time
14 making a case that would be symmetrical that you could take
15 the voice tube out the top and the ear tube out the
16 bottom for one usage or you could use the same case and
17 have it upside down and have the voice tube out the bottom
18 and the ear tube out the top?

19 A No.

20 Q I understand your patent attorney at this time
21 was Mr. Test.

22 A Yes.

23 Q Do you know whether you mentioned to him that
24 you were aware of the Oticon hearing aid which had the two
25 tubes at the top?

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Hutchings-direct

MR. ARNOLD: May it please the Court, I think the question is asking specifically for an attorney-client communication. We object to the question.

THE COURT: Read the question again, please.

(Question read.)

THE COURT: What do you say about the objection that that calls for a privileged communication?

MR. BRADLEY: Your Honor, I am dealing with the transfer of public information to the attorney, and I think in this circuit, at least as I read some of the recent decisions, the transfer of public information to an attorney doesn't fall within the attorney-client privilege.

THE COURT: It is not public information that he knew about it. Insofar as a communication concerns what he knew about public information, then it isn't public.

MR. BRADLEY: Let me see if I can get at it a different way.

THE COURT: All right.

First of all, I would like to show you Defendant's Exhibit K-1 so that it is clear what we are talking about as far as the Oticon hearing aid goes, and it is behind tab 6. This I understand is the Oticon hearing aid that we have been referring to, is that correct?

Yes.

1 GW4

Hutchings-direct

2 Q And this has two tubes at the top, one is a
3 microphone tube and the other is a receiver tube?

4 A Right.

5 Q What I would like to find out, Mr. Hutchings, is
6 whether this reference was ever called to the attention of
7 the Patent Office in view of the fact that it has the
8 voice tube over the ear or microphone tube over the ear.
9 Did you ever call it to the attention of the Patent Office?
10 I assume you weren't in communication with them, so maybe
11 it is a silly question.

12 A No, I didn't.

13 Q Do you know whether your patent attorney did?

14 A I haven't an idea, no.

15 Q Do you recall whether you instructed him to do
16 so?

17 MR. ARNOLD: I object to the question as calling
18 for an attorney-client communication.

19 THE COURT: I am going to sustain it, but I am
20 going to ask the witness this question.

21 Do you know whether or not your attorney knew of
22 this patent?

23 THE WITNESS: I don't know, your Honor.

24 MR. ARNOLD: May it please the Court, the objec-
25 tion I think is as good whether the question comes from

GW5

Hutchings-direct

counsel or from the Court.

THE COURT: Yes. If it is good one way it is probably good the other. I didn't ask the same question. I didn't ask him about a communication. I asked whether he knew if his attorney knew of it. He said he didn't know. So with that answer --

THE WITNESS: I said I didn't know.

THE COURT: So I think your objection becomes moot, doesn't it?

MR. ARNOLD: I think so.

MR. BRADLEY: Your Honor, this is not actually a patent but it is just the Oticon hearing aid itself. This is a photograph we have of it here.

Q Did you review any of the arguments that your patent attorney made to the Patent Office in securing a patent on the Hutchings patent in suit? I am referring to what we call the 118 patent.

A Is this the design?

Q It is the utility patent.

A No, the job was given to the patent attorney and he did all that was necessary. He came back once or twice, wanting to alter wording, and things like this, but I had nothing to do with the Patent Office.

Q You mean if he presented arguments you did not

1 GW6 Hutchings-direct

2 personally review them?

3 A No.

4 Q You don't know whether he relied upon the voice
5 tube going over the ear to secure the utility patent in
6 suit?

7 A No.

8 Q Mr. Hutchings, we have had a discussion of
9 torque off and on, and in connection with your utility patent,
10 the 118 patent, and I am thinking particularly of a fore and
11 aft direction.

12 A Right.

13 Q I refer you to Defendant's Exhibit I and to page
14 3. I am referring to the yellow part where it states
15 that this is one of the claims of the patent and I am not
16 taking it up with you because it is a claim, I am just
17 taking it up with you in terms of the technical contents of
18 what is stated. It is stated there:

19 "The weight of the voice tube provides a torque
20 which counteracts the torque introduced by the weight of
21 the housing to balance the headset and securely hold the
22 same on a wearer's ear."

23 Now, does the weight of the voice tube on the
24 StarSet balance the weight of the housing?

25 A No, it doesn't balance it. It counteracts it.

1 GW7

Hutchings-direct

2 There isn't enough weight in the voice tube to balance the
3 weight of the cable, but there is some weight there that
4 counteracts the weight of the cable.

5 Q In other words, whatever torque the voice tube
6 produces would be in a direction opposite to the direction
7 the housing and the cord produces, correct?

8 A Right.

9 Q But there is really not very much weight to
10 produce that torque in terms of the voice tube, is that
11 correct?

12 A That's right.

13 Q If it did have enough --

14 A It still counteracts it. It is all a question
15 of degree.

16 Q I am inclined to agree with you it is in the
17 opposite direction. I am also inclined to agree there
18 isn't very much torque from the voice tube.

19 Let me ask you an additional question. If the
20 weight of the voice tube or its torque were sufficient to
21 actually balance the weight of the capsule behind the ear,
22 wouldn't you have a very unstable situation?

23 A Right.

24 Q So that isn't it a fact that whatever torque the
25 voice tube produces is actually a disadvantage rather than

GW8

Hutchings-direct

an advantage?

A No. As I said before, it is a question of degree. You have quite a lot pulling on the back of your ear. If you can take a little off, fine, it helps. It doesn't degrade the operation of the device at all. If, as you say, it was very heavy, yes, you have a problem, but if it is not heavy, any weight that is there tends to be counteractive to the thing hanging over the ear.

Q Isn't it like pulling against -- if you have a hook in the front and you pull back harder, doesn't it hold it more stable than if you don't pull back?

A If you pull it harder, you will be Van Gogh with no ear.

Q I agree with that.

A As I said, it is a question of degree.

Q You said you recall what is in the Flygstad patent, which is the voice tube under the ear.

A Yes.

Q With the fulcrum point being somewhere near the top of the ear or that region, the voice tube, whether it is at the bottom or the top produces a torque in the same direction, does it not?

A No, not quite. The amount of the voice tube that is forward of the center of gravity, yes, of the

GW9

Hutchings-direct

center, the pivot center. The amount that is forward of the pivot center, yes. The amount that is behind, no.

Q In other words --

A In other words, part of it is in one direction and part of it is in another.

Q Let's say the forwardmost part of it under the ear would produce a torque vis-a-vis the behind-the-ear case the same as the over-the-ear.

A Right. The part of the tube that is behind the center line produces in the other direction.

Q So that in one case the torque is not very appreciable in the over-the-ear version, but in the under-the-ear version it may be even less appreciable?

A Yes.

1 THE COURT: I don't know what center line you are
2 talking about. You are talking about a part of the tube
3 behind the center line. Is there any part of the tube
4 behind the center line?
5

6 MR. BRADLEY: Your Honor, were you looking --

7 THE COURT: I am looking at the Flygstad Patent.

8 MR. BRADLEY: That is Tab 1.

9 THE COURT: The center line of what is what I am
10 asking.

11 THE WITNESS: Pivot.

12 THE COURT: The center line of what?

13 THE WITNESS: Where it is pivoting on the ear.

14 THE COURT: The fulcrum?

15 THE WITNESS: Right.

16 THE COURT: I take it in Flygstad that is near the
17 top of the casing, in other words, the weight of the voice
18 tube would tend to cause the casing to rotate in a counter-
19 clockwise direction which would cause it to engage the ear
20 at the upper corner of the casing which would act as a pivot
21 point and pivot around that point insofar as we consider
22 the torque imposed by the voice tube, is that your
23 understanding?

24 THE WITNESS: Yes.

25 THE COURT: Then I don't think there is any

significant part of the voice tube that is behind that pivot point. It is all forward of that or to the left as viewed in Fig. 4 of Flygstad.

THE WITNESS: This depends on the geometry of the ear to a large extent. It doesn't always lay like this. In some people it will be way up here and in some it will be the other way. Ears are very variable.

THE COURT: I see what you mean. You drop a vertical from the fulcrum?

THE WITNESS: Right.

THE COURT: If any part of the voice tube is rearwardly of that vertical line, then it would tend to cause the casing to rotate in a clockwise direction?

THE WITNESS: Yes.

THE COURT: All right.

Q Mr. Hutchings, there are some findings that were proposed by Plantronics and which I have not been agreed and I would like to ask you just about a couple of them.

This is finding 17.12. It says:

"On January 2, 1969, his thinking shows all curves."

I don't understand that to be a reflection on you -- I am really only kidding -- but we are talking about the shape of the thing.

A Right.

1
2 Q Your thinking showed all curves. Now, this in
3 fact is not the over-the-ear and under-the-ear version of
4 the device at all, is it?

5 A Right. That is my first sketch.

6 Q This is the version of the headset with the two
7 tubes over the ear?

8 A Right.

9 Q And then plaintiff's finding 17.13:

10 "A suggestion of flattening the top and introducing
11 plane surfaces at the bottom appeared by January 8th."

12 Now, that again has nothing to do with the head-
13 set with the voice tube over the ear and the ear tube under
14 the ear, does it?

15 A No.

16 Q In fact, by January 8th you had already laid out
17 the first sketch in connection with the voice tube,
18 one over the ear and the other tube under the ear, isn't
19 that correct?

20 A That is correct.

21 Q In plaintiff's finding 17.14, it says:

22 "A further evolution, showing the two-faced bottom
23 portion and a partially plane back, appears in plaintiff's
24 January 16th sketch."

25 And this in fact is one of the drawings with

App. 877

1 the voice tube over the ear and the ear tube under the ear,
2 is it not?

3
4 A Yes.

5 Q But that shape is essentially the same shape as
6 you had on the first day with the same type of headset on
7 figuration, is it not?

8 A No, you can't say that. Weren't you referring
9 this to the one that is both over the ear?

10 Q Let me clarify my question. I see what the prob-
11 lem is.

12 I am saying that the sketch which is January 16th,
13 which would be the sketch on page 3 in Defendant's Exhibit
14 DD, that didn't we say is essentially the same as the
15 first sketch that appears for that type of headset with the
16 one over the ear and the other under the ear on January
17 4th.

18 A That is the whole point of it. I have a shape
19 here and I have to make a model to try it out. It takes a
20 little time.

21 Q What I am trying to do is clarify confusion
22 between going from one headset that is rounded with two tubes
23 at the top and the other headset which has one at the top
24 and one at the bottom.

25 A The thing to remember is I am very early
on design here. I haven't started thinking about

1 what it is going to really look like. I am
2 trying to get pieces into a shape, obviously the smallest
3 housing I can bear.
4

5 Q And you are referring to your January 4th drawing?

6 A Right.

7 Q But the final version did not end up being really
8 substantially different than that, did it?

9 A Oh, yes.

10 Q As far as the same configuration headset where
11 you had one over the top and one under the bottom?

12 A Yes, the same configuration but a vastly different
13 shape than this.

14 Q Vastly different shape. Let me see. The
15 difference is whether that there were differences in detail
16 over the ear and it changed to have a bayonet connection
17 for the projection over the ear, that was one, is that
18 correct?

19 A Yes.

20 Q And No. 2 was you had to plug in at the back,
21 and No. 3 was you expanded the top when you included
22 the larger size microphone?

23 A Right.

24 Q Were there other changes other than those three?

25 A Yes. I allowed quite a lot more space for the

socket. I moved the whole thing.

Q You mean the plug-in socket?

A Yes, in the back. If you will notice, this is a very -- that is hopeful. That is dreaming a little.

Q Why don't we call out the number. This is on page 4?

A 4. The amount of space allowed there for the socket is minimal.

Q That is for the plug-in connector?

A Right. I couldn't get it in that space with that size cable, so I had to widen the whole thing out.

Q You moved the transducers apart?

A Yes. I made some sockets like that. That's what convinced me it wasn't good.

Q How does that compare with the final version?

A This is still not completely final.

Q That is page 9, the April 18, 1969 drawing.

A Right hand view.

Q Right hand view. I'm sorry.

A I don't think I am quite out to my full width there, but I have to check on it.

Q So in the final version you may have had further spacing --

A I have a lot more spacing here than I have here.

Q Between pages 4 and 9?

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A Right.

Q There is additional spacing for the housing?

A The transducers are moved apart.

Q But aside from those changes there were no changes from the first day let's say in this book, DD, there were no changes from the first drawing to the last, were there?

A If you like to say changing the transducer, the shape of the capsule and the space for the socket were not changes, this is true, but you can't say that.

Q I am not saying that. I am saying we listed the changes.

A They are quite considerable.

Q They are considerable changes and we have listed the three of them. Does that cover the changes? What I was trying to do is determine all of the changes between the first drawing and the last drawing in Exhibit DD.

A Change in socket, change in transducer, change in capsule shape. I think that's it, yes.

Q Were all of these changes made for functional reasons?

A Yes. Then after that we do a little bit of industrial design.

Q There is one additional finding which is 17.15, a proposed finding, and it states:

1 "The first device actually fabricated
2 on February 4, 1969, still contained many curves."

3
4 A Yes.

5 Q This is your first working model that is shown
6 here, is it not?

7 A Yes.

8 Q I think we have a copy of that in the record.
9 I don't know how to identify it except that it is dated
10 February 4, 1969.

11 MR. JANICKE: You have the physical specimen
12 here, Exhibit 103.

13 Q So we can correlate the drawing with the physical
14 specimen, it is Plaintiff's Exhibit 103, is that correct?

15 A Yes.

16 Q And do you agree that this still contained many
17 curves?

18 A Yes.

19 Q Mr. Hutchings, I hand you a copy of the other
20 Hutchings patent we mentioned, which is 3, 610, 841, and
21 do you know whether your patent lawyer called the attention
22 of the Patent Office in connection with this case to the
23 Oticon hearing aid with both tubes over the top?

24 A I don't know. I know nothing about it.

25 THE COURT: Which patent is this you have just

1 handed him?

2
3 MR. BRADLEY: A continuation in part case, your
4 Honor. It is not in this suit. It is a continuation
5 in part of the Hutchings suit.

6 THE COURT: Wouldn't that be subject to the same
7 ruling before that any fraud that obtained in that patent
8 wouldn't render unenforcible the patent in suit?

9 MR. BRADLEY: What I wanted to find out is if the
10 same examiner might be handling both cases.

11 THE COURT: Why would that be relevant?

12 MR. BRADLEY: If he had the reference in connection
13 with one case, the party might say it wasn't necessary
14 to give it to him in the other case. I just wanted to
15 explore that.

16 THE COURT: All right. Go ahead.

17 Q I think you have already answered the question
18 that you don't know whether the Patent Office had the Oticon
19 hearing aid in connection with this case either.

20 A I don't know.

21 THE COURT: You don't have the file wrapper in the
22 other case?

23 MR. BRADLEY: We have that in the record, too,
24 your honor.

25 THE COURT: I would say that any attorney who call

1 a reference to the attention of the examiner and doesn't make
2 it of record is acting at his own peril.

3
4 MR. BRADLEY: I was interested in finding out if
5 there was any other information on it that is not in the
6 actual record.

7 Q Mr. Hutchings, I show you a document which I think
8 you saw in the depositions. It is a Ministry of
9 Aviation report on user trials of the Plantronics Model MS-50
10 lightweight headset.

11 A Yes, I saw this for the first time at the deposition,
12 yes.

13 Q I just wanted to ask you a question on one portion
14 of it. It is my understanding that this British organization
15 in the period of time, 1962, ran some user tests on the
16 MS-50 and this is a report on those tests and there are
17 some comments people made in the course of taking the test
18 and trying out the MS-50 headset. Is that your understanding?

19 A Yes.

20 Q One of the --

21 THE COURT: What exhibit is this?

22 MR. BRADLEY: Defendant's Exhibit VV.
23
24
25

1
2 Q We are just referring to the top of page 5.
3 There is a paragraph there numbered 5.7 and this apparently
4 is one of the suggestions made and it states:

5 "The possibility of making a self-supporting
6 capsule"-- let me start over.

7 This is comparing it with the MS-50 that clipped
8 on, is that right?

9 A Yes, I understand.

10 Q So that the possibility of making a self-supporting
11 capsule and microphone tube to hook over the ear is worthy
12 of consideration.

13 Isn't this man suggesting that you have a self-
14 supporting capsule and the microphone tube hook over the
15 ear, in other words, isn't he suggesting that the microphone
16 tube go over the ear?

17 A Well, I read that more as a generic suggestion
18 because if you go back to paragraph 4.6, "It was suggested
19 during the trial that the headset is so light it might be
20 feasible to incorporate the capsule into a self-supporting
21 earpiece hooked over the ear as is done with some type of
22 deaf aids."

23 I would categorize that and this is a sort of
24 generic suggestion of a behind-the-ear capsule. A headset.

25 Q In your depositions as you gave them initially,

1 didn't you indicate that this was the same concept as you
2 yourself had and then subsequently you modified that when
3 you were giving the deposition to provide that you meant
4 it was the same concept in the sense that it was the behind-
5 the-ear capsule?
6

7 A Yes, that is right.

8 Q Mr. Hutchings, I understand you received an indus-
9 trial design award for the StarSet, is that correct?

10 A Yes.

11 Q I'm referring now to Plaintiff's Exhibit 121.
12 That was at the Wescon Show in 1970?

13 A I believe it was '70, yes.

14 Q Without deprecating the award I'd like to bring out
15 for the record that apparently the main award that this
16 organization gives, which is called a pacemaker design
17 award, that there were no pacemaker design awards assigned
18 that year, is that correct?

19 A I don't know. I can't remember. It would be one
20 of the few years that they were not. I haven't mine marked
21 off.

22 Q Well, mine is red underscored and it is -- I
23 don't know that the pages are numbered but on page 4, the
24 fourth page on the left it indicates none of the 26 selected
25 items this year qualified as pacemakers, is that correct?

2 A That's right. It gets a little more interesting
3 when you read on, doesn't it?

4 THE COURT: Off the record.

5 (Discussion off the record.)

6 Q It appears as you read on the author of this article
7 is lamenting the lack of design perhaps in this country.
8 He says in the next part, "Does the leadership attitude
9 that made us the most advanced nation in the world still
10 prevail."

11 Does he not?

12 A Yes.

13 Q There is also in one page back, there is an
14 indication that there were five excellence award winners
15 and I'm now referring to the first paragraph of the
16 remarks by Mr. Goldsmith in the last line of the first
17 paragraph. In the copy of the exhibit we were
18 furnished there is no indication of who won the award of
19 excellence but I have copies of other portions of it and
20 apparently the five awards of excellence are various others.

21 In entry No. 4, No. 11, No. 14, No. 16 and
22 No. 18, is that correct?

23 A Yes.

24 Q So that the StarSet did not receive an award of
25 excellence, is that correct?

2 A No, but I reckon against this competition we did
3 pretty well. Computers, computer designed drafting tables,
4 powerline modules, flame photometers. Dual image recorder.
5 It is not bad, a little headset against that competition.

6 Q You were reading off the ones that won the awards
7 of excellence?

8 A Right.

9 MR. BRADLEY: I have no further questions.

10 THECOURT: Any cross?

11 MR. JANICKE: Yes, your Honor.

12 CROSS EXAMINATION

13 BY MR. JANICKE:

14 Q Mr. Hutchings, can you tell us something about your
15 background before you came to work for Plantronics?

16 A I was educated at Acton Technical School in London.
17 I was there for three years. Then three and a half years
18 night school at the same Acton Technical College. I got
19 a National Certificate in electrical engineering after
20 the first two years of the night school.

21 I then spent five and a half years -- five
22 years and three months in the Royal Air Force. From 1946
23 to 1950 I was employed by E. Shipton & Company.

24 Q What did you do there?

25 A I started as a designer, went to chief designer

2 through works manager to technical director. I was there
3 for ten years. The last three years I was technical director.

4 Q What kind of things did you design?

5 A Loudspeaking telephone. Many British films of
6 this period, the executive has on his desk a loudspeaking
7 telephone. That's the one I designed.

8 I did two hearing aids. Two office tape recorders,
9 dictating machines. And several development projects for
10 various government departments.

11 Designed a sealed toggle switch for the
12 Minister of Supply and a sealed jack for the Admiralty.

13 THE COURT: I don't know the relevance of this, Mr.
14 Janicke. Suppose he painted the ceiling of the Sistine
15 Chapel, would that help him on the design patent of this
16 particular design?

17 MR. JANICKE: No, it wouldn't, your Honor, but
18 defendant didn't put in any background on where this
19 man came from or where his thinking came from. I understand
20 it is getting late.

21 THE COURT: It's not that. You can go on with
22 anything that is relevant however long it takes but I really
23 wonder whether this is competent evidence insofar as
24 the patentability of any of the patents in suit is concerned.

25 MR. JANICKE: It is essentially background informat

2 your Honor.

3 Q What type of hearing aids were the two hearing
4 aids you designed at Shipton?

5 A They were fairly large state of the art at that
6 time, about that by this. Went into the shirt pocket. Not
7 post-auricle.

8 Q When you came to Plantronics, what was your
9 first job there, what were you doing when you first came
10 there?

11 A One of the problems that we had was a system of
12 documentation that was just a mass of information. We
13 didn't have a really good drawing system so I redid the complet
14 drawing system.

15 Q Can you tell me the first design project that you
16 did there?

17 A It was to redesign the MS-50 hearing aid -- headset.

18 Q What did you do with respect to that?

19 A It was originally an aluminum extrusion that was
20 sliced and two plates put on the side. This made the
21 capsule. The transducers were mounted in with beautiful
22 buffer around with a couple pieces of foam on each side.
23 I redesigned this into a two pice plastic molding with
24 transducer boots that you actually put the transducer in
25 before you put them in the housings.

1 lzrf 7

Hutchings-cross

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2 Q Was it shortly after that that you began work on
3 this project that led to the StarSet?

4 A Yes.

5 Q How did that StarSet project get under way,
6 do you recall?

7 A We did a bid on the Bell 61 headset and we didn't
8 get it and so there was a meeting where we were told we got
9 to beat the 61.

10 Q You mentioned before that there was a very urgent
11 situation because of your large sales to Western Electric.
12 Was there some anticipation in the sales of the MS-50 were g
13 to go down because of the introduction of the Model 61?

14 A It was considered that if Bell had their own head-
15 set they possibly wouldn't need any more of ours and that
16 was possibly 80 per cent of our business. It was very urgen

17 Q So the job as announced to you was to beat the
18 Model 61?

19 A Right.

20 Q How did that project get going to beat the Model
21 61, do you recall the task force set up by Mr. Graham?

22 A Yes. There was myself as project engineer.
23 Bernardi who is now vice-president of engineering was
24 the acoustics and electronics man. And Fred Parker, our
25 chief manufacturing engineer who was for production problems

1 lzrf 8

Hutchings-cross

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2 and this sort of thing.

3 Q What was Mr. Graham's directive to the task force,
4 if you recall?5 A We got to have a headset that was comfortable,
6 didn't need any special molded attachments and it shouldn't
7 have any eyeglass clips and it shouldn't have any headbands.8 Q What was the first thing you can recall doing after
9 being given those directives, either by yourself or with
10 other people? What did you do when Mr. Graham said that
11 is what we want to have?12 A I sat down and thought about it for a while.
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Tk 5B

zb-1

Hutchings: cross

2 Q Was this before the engineering meeting that
3 has previously been described?

4 A Yes. As far as I can remember, yes, definitely.
5 I happened to have an Audotone hearing aid case in my drawer.
6 We had been down to Audotone some time previously, Mr.
7 Schomberg and I, to discuss ear molds, and I picked this up
8 and I was looking at it and I thought well, that looks to me
9 like a pretty good idea. That is one of the -- this is one
10 of the MS50 acoustic tubes and this is the hearing aid.

11 Q When you say that, you mean the tube connected
12 to the --

13 A Tube connected to the hearing aid case.

14 Q Where is it connected to the case?

15 A On the receiver outlet.

16 Q Used as a hearing aid and before you put the tube
17 on it, where would the microphone sound have entered?

18 A Down here.

19 MR. JANICKE: Let the record show here is --

20 THE WITNESS: The bottom of the case.

21 MR. JANICKE: The bottom of the case.

22 Q So you had a MS50 tube and the case for an
23 Audotone hearing aid?

24 A Yes.

25 Q You are by yourself in your office?

1 zb-2

Hutchings-cross

2 Q You stick the --

3 MR. BRADLEY: Your Honor, I don't want to
4 object to leading questions but I would rather have the
5 witness's story than counsel's.

6 MR. JANICKE: Well, it is cross-examination,
7 your Honor.

8 THE COURT: Not cross-examination of an adverse
9 witness. You don't get the privileges you would if this
10 were cross-examination of a witness offered as its own
11 witness by the other side.

12 I will sustain the objection.

13 Q Was anybody with you in the office?

14 A No. So I wandered into Schomberg's office and
15 Bernardi was in there. I hooked this on my ear, and I said
16 how about that. And the reaction was extremely good.

17 Q I believe you testified before that at some time
18 you had considered the approach such as in Flygstad in the
19 post-article headset of putting the voice tube on the
20 bottom. is that right?

21 A Yes.

22 Q What was your view of that type of arrangement?

23 A I didn't have a very high opinion of that. You
24 are hanging your capsule over your ear and then like a
25 pendulum on the bottom of it, you are attaching a voice tube

1 zb-3

Hutchings-cross

2 and it seems to me this is going to be very unstable.

3 Q Why would that be unstable?

4 A Because of the weight of the voice tube at
5 a distance away from the pivot point.

6 Q How would that cause an instability in actual
7 use?

8 A There is going to be a tendency for the headset
9 to swing due to this mass hung low down.

10 Q To swing? Which way or ways?

11 A Laterally.

12 Q From left to right?

13 A Yes. As you move your head, the tube is going
14 to tend to overthrow all the time.

15 Q We are still speaking of when you went in to
16 Mr. Schomberg and Mr. Bernardi and demonstrated a piece of
17 tubing on the Audotone capsule, are we still speaking of
18 prior to the engineering meeting?

19 A Yes. On the minutes of the engineering meeting
20 it says I am laying out post-auricle device.

21 Q The notes of the engineering meeting, which is
22 Defendant's Exhibit FF, occurred subsequently to your showing
23 this to Mr. Schomberg and Bernardi, show there was still
24 consideration of other types of headsets?

25 A We were wide open. The minds were wide open.

1 zb-4 Hutchings-cross

2 Any input was welcome at that time.

3 Q Do you remember who proposed which of these
4 various kinds of possible headset configurations?

5 A I forget what they are now.

6 Q First after the examination of hearing aids,
7 under headset configurations considered, the first one is
8 post-auricle.

9 A That is my suggestion.

10 Q Had anyone else among this group here or anyone
11 else at Plantronics for that matter suggested a post-auricle
12 hearing aid -- a post-auricle headset configuration at
13 that time other than your story of how you went to Mr. Bernardi
14 and Mr. Schomberg?

15 A No.

16 Q Had anyone stated anything against doing it that
17 way?

18 A Yes. Mr. Graham was not very keen on the idea.

19 MR. BRADLEY: Your Honor, I hate to object
20 again to leading questions.

21 THE COURT: Well, that last question wasn't leading.

22 MR. BRADLEY: Did anyone object? He is trying to
23 establish that people were against it and they went ahead
24 anyway.

25 I withdraw my objection, but I would like to

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1 zb-5

Hutchings-cross

2 have the questions less leading.

3 THE COURT: All right.

4 Q Do you recall what Mr. Graham said?

5 A He said something about they tried that earlier
6 and it was unstable.

7 Q Did he say that to you?

8 A I believe so. I think it was when there was
9 several of us around.

10 THE COURT: He tried what earlier?

11 THE WITNESS: I presume the post-auricle. That
12 is what we were talking about, your Honor.

13 THE COURT: With the voice tube --

14 THE WITNESS: There was nothing specific about
15 which way he tried it.

16 Q The next configuration considered, still under
17 post-auricle or under post-auricle is first listed as stand-
18 ard and then noise canceling. Was your proposal standard,
19 noise canceling or both?

20 A My proposal is just standard.

21 Q Whose proposal, if you recall, was noise-cancel
22 ing?

23 A It sounds like Bernardi.

24 Q The next configuration is near the ear direction
25 mike with ear insert. Do you know whose proposal that was?

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1 zb-6

Hutchings-cross

2 A That was Bernardi. The thought there was to
3 mount a microphone up by the ear, up here, and not have any
4 tubes, but some experimentation was done with this approach
5 but the head in a microphone pattern, the head acts like
6 a mountain, it is a very large mass. Acoustically it appears
7 that way. It destroys the pattern.

8 Q Was this experimentation with the near the ear
9 directional microphone that you speak of done at Plantronics
10 or elsewhere?

11 A At Plantronics.

12 Q How long was that pursued, if you know?

13 A Long enough to find out -- find there were
14 problems, two or three days, I would say.

15 Q The next one listed is receiver with directional
16 microphone in locket. Do you know who proposed that?

17 A I don't think Mr. Graham was at the meeting, but
18 if he was, it would sound very much like one of his suggestions.

19 Q Mr. Graham?

20 A Yes. He wasn't at the meeting, though, was
21 he?

22 Q He is not listed as having been there.

23 A It couldn't be he then. I don't know who it
24 was.

25 THE COURT: I take it a locket is something that

1 zb-7 Hutchings-cross

2 would hang on a pendant around the neck?

3 THE WITNESS: Yes, your Honor.

4 Q Why do you attribute that concept to Mr. Graham?

5 A Just a feeling. No reasons.

6 Q Do you recall whether at the meeting you stated
7 your post-auricle preference in any more detail than was
8 indicated in your putting the piece of tubing on the Audotone
9 case?

10 A Yes, I did one thing. I stood on my head, stood
11 on my hands with a headset just to prove it wasn't unstable.

12 Q The notes of the meeting indicate that the next
13 thing you did or the next activity planned was for Hutchings
14 to make a layout of Type 2A, which is the --

15 A I think you will find it doesn't say that. It
16 says Hutchings is making layout. It is already in process.

17 Q Excuse me. The engineering meeting is December
18 21st. You already have in process a layout?

19 A Right.

20 Q Can you identify --

21 THE COURT: I note that your notebook says that
22 you started work Monday, 23 December, 1968, to lay out conce
23 et cetera.

24 THE WITNESS: Yes.

25 THE COURT: That seems inconsistent with the

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Hutchings-cross

statement that as of December 21, you had already been working on layouts.

THE WITNESS: Can I have some pieces of paper?

You are right, your Honor, but I am fairly sure that I was doing this when the meeting started.

THE COURT: Well, I note that this entry was made January 13, 1969, about three weeks after the work started and apparently you were wrong about the date.

THE WITNESS: I could have been off, right. I was definitely laying this out when this meeting took place.

THE COURT: How much more are you going to have by way of cross, Mr. Janicke?

MR. JANICKE: I would expect about 25 minutes, your Honor.

THE COURT: I am going to have to leave very shortly to go to Philadelphia. They have a transit strike there and everybody is driving, so the traffic is going to be worse than usual. I can rearrange my morning schedule tomorrow so that we can start again at 9:30 a.m. and go until 12:45, if that will allow us to finish.

MR. BRADLEY: Yes. We don't have very much more.

MR. ARNOLD: How much more do you have with Mr.

Mol?

MR. BRADLEY: I think an hour.

1 zb-9

Hutchings-cross

2 MR. ARNOLD: No problem with finishing in the
3 morning.

4 THE COURT: Let's adjourn now and come back
5 at 9:30 in the morning.

6 I will rearrange my pretrial conferences to-
7 morrow to make the whole morning available.

8 All right.

9 (Adjourned to Friday, March 21, 1975,
10 at 9:30 A.M.)

11 -----

WITNESS INDEX

<u>Name</u>	<u>Direct</u>	<u>Cross</u>	<u>Redirect</u>	<u>Recross</u>
Daniel William Martin (Resumed)		560	621	
Michael Santi D'Agostino	641	643		
Kenneth James Hutchings	649	705		

EXHIBIT INDEX

<u>Plaintiff</u>	<u>Identification</u>	<u>In Evidence</u>
143-A, 144-A		542
141-A		543
146		640

Defendant

CCC	635
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1 la 1zrf 1

2 Plantronics, Inc.

3 vs

4 Roanwell Corporation

5 New York, New York
6 March 21, 1975-9:30 a.m.

7 (Trial resumed.)

8 THE COURT: Good morning.

9 K E N N E T H J A M E S H U T C H I N G S,

10 resumed the stand and testified further as follows:

11 MR. BRADLEY: Your Honor, I at one or two house-
12 keeping items. On the Defendant's Exhibit JJ that we
13 discussed yesterday, I understand that we have now agreed,
14 counsel has now agreed that that is admissible and in turn
15 we have agreed that they might file a substitute summary
16 of the Larkin deposition that was taken in this suit so
17 that they can comment on anything that might be relevant
18 to JJ.

19 I think otherwise we have offered all of our
20 exhibits to date in evidence and in the event we missed
21 any, I make that reoffer now, with the exception of II,
22 1 through 19.

23 The last point I have was that I learned last
24 night that the starting time of selling the R-70 was earlier
25 than the starting time -- I'm sorry, the R-71 was earlier

App. 903

2 than the starting time for the R-70. I didn't get that
3 exact information but I did inquire since the Court asked
4 that question, but we will find those dates and supply them.

5 THE COURT: The only purpose of my question was
6 to find out whether this period that he used for comparing
7 sales was a period during which both were being sold
8 throughout.

9 MR. BRADLEY: I'll check that, your Honor, because
10 it may have been one started at the beginning of the period
11 and the other started three or four months later.

12 THE COURT: I wanted to make sure it was a fair
13 comparison.

14 MR. BRADLEY: We will doublecheck that.

15 MR. JANICKE: The present information is that the
16 R-71 was sold first?

17 MR. BRADLEY: That is correct.

18 MR. JANICKE: We have also reached a stipulation,
19 your Honor, on the Roanwell lightweight headset, that it
20 does include amplification. That was mentioned by sub-
21 sequent witnesses to Mr. Foley and we offer to stipulate
22 that there is amplification on the microphone side of the
23 Roanwell lightweight headsets.

24 MR. BRADLEY: Yes, that is agreed.

25 THE COURT: That is, in the unit mounted on the

2 ear?

3 MR. JANICKE: Yes. The location of the amplifier
4 varies from unit to unit. It could be up in the cap, it
5 could be in the plug housing. But it has it for the microphone
6 side, not the receiver side, the same as in all the other
7 headsets.

8 THE COURT: All right.

9 MR. JANICKE: I would like to offer into evidence
10 as Exhibits 147 to 150, four depositions which we have already
11 summarized and submitted to the Court and they are Rodgers,
12 Metcalfe, Burnell and Leonhardt.

13 MR. BRADLEY: No objection.

14 (Plaintiff's Exhibit 147 through 150 received
15 in evidence.)

16 MR. JANICKE: Mrs. Clinton has verified that those
17 transcripts are in the court.

18 THE COURT: All right.

19 CROSS EXAMINATION

20 BY MR. JANICKE (Resumed):

21 Q Mr. Hutchings, yesterday you were telling us at
22 the recess about the project in which you designed the
23 Plantronics StarSet. To what extent did you use either
24 the Audiotone or Oticon hearing aid cases in designing the
25 StarSet?

1 A I used three hearing aid cases to check the radius,
2 the mates around the ear. That's all. This is human
3 engineering. There must be dozens of hearing aids on the
4 market and it is pointless to reinvent the wheel so I checked
5 what was happening in the trade and the piece that goes against
6 the ear and comes over here, I measured those dimensions.

7 Q In your design effort did you consider the
8 location of the input or output ports of the Audiotone or
9 Oticon cases to any extent?
10

11 A No. It bore no relation to what I was trying to
12 do.

13 Q You testified that you changed the drawings at
14 one point, as shown on page 9 of Defendant's Exhibit DD
15 from the configuration shown on the left side of page 9
16 to the configuration shown on the right side of page 9,
17 is that correct?

18 A That is so.

19 Q What was the objective?

20 A It was a management decision to use the standard
21 size -- the square microphone instead of a half size micro-
22 phone that I had started out with.

23 Q What was the shape of the half size microphone
24 originally contemplated?

25 A Rectangular.

Q You were saying the objective was what?

A To accommodate a microphone of the same size as the receiver, which we were using in the MS50 headset, so that our buying would be all the same type of microphones.

Q Did that present any design problems?

A Yes. It meant I had to change it. I had to provide a lot more space in the capsule for the microphone.

Q With respect to appearance, can you tell us what your original objective was as reflected in -- perhaps the left side of Page 9 compared to your appearance objective on the right side, if there was any difference?

A Of course, to recount my exact thought processes after all this time is a little difficult, but looking at it now I would say the left hand design, we got a small transducer and by curving the capsule close to the transducer, it practically hid the whole capsule behind the ear, so there we were trying to hide it. When we have to go to the bigger microphone, you can't possibly hide all that behind the ear so if you can't hide it, let's show it.

Q Do you know any examples of how you could accommodate the larger microphone with a different shape capsule from the one you employed for the StarSet?

A There must be dozens of ways of doing it. Last night I sketched out a few of them to give you a rough

1 zb-2 Hutchings-cross

2 idea of some of the ways it can be done.

3 Q These are marked Exhibits 151, 152, 153, 154.

4 MR. BRADLEY: If it is being offered, I have
5 no objection.

6 MR. JANICKE: I have no objection.

xxx

7 (Plaintiff's Exhibits 151 through 154

8 were received in evidence.)

9 Q Would you briefly describe these alternate con-
10 figurations and indicate whether or not there would be any
11 functional impediment to making the headset that way?

12 A Actually, with the microphone turned round
13 like this it is slightly easier --

14 Q You are referring to Exhibit 151?

15 A 151. The microphone turned around like this
16 it is slightly easier because we have a tube coming in from
17 the nose of the device and it is a fairly easy curve to
18 go onto the port of the microphone. With the way I finished
19 up, similar to the right hand on Exhibit 9 here, Fig. 9,
20 I have to put a bend in my microphone tube to line up with
21 the port because my port is out of line. I put the micro-
22 phone in the position it is for getting the shape on the out-
23 side of the case rather than getting a good sweep on the micro-
24 phone tube.

25 152, the microphone, the same position.

1 mb-3

Hutchings-cross

2 Different shape on the back.

3 153 -- they are all curved surfaces.

4 Q How about the plug housing?

5 A Plug housing is curved on this one. It is
6 a slight projection on this one. A lesser projection on
7 this one.

8 Q The three being exhibits --

9 A In order, 153, 152 and 151.

10 Q Thank you.

11 A Then 154 is basically modification of a Flygstad.
12 Instead of having a ball joint and socket, it is just
13 formable tube coming out.

14 Q Is the housing shown on the right side of Page 9
15 of Defendant's Exhibit DD the capsule configuration as it is
16 actually made? I believe you said it was substantially
17 the same?

18 A Substantially the same except that the top line
19 along the capsule has got a bend in it here, got two planes.

20 Q "Here" being on Page 9?

21 A Page 9, right-hand side. And that I straightened
22 out in the final design and I believe there is a larger space
23 between the two transducers to allow a little more space in
24 there for the plug and socket on the final design.

25 Q I have one last question. As far as your exper-

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Hutchings-cross

1 ience is concerned in the work that you have done prior to
2 and at Plantronics, how do you proceed with a design
3 project? What is your general approach?

4 A Well, the first thing you have to do is get all
5 the information. Decide on all the parameters that you
6 are trying to meet. Then my way of operating is once I have
7 determined all this, I get a big sheet of paper and put it on
8 the drawing board and I start drawing. This, I find, is a
9 pretty good way of doing it. I don't necessarily -- I
10 don't usually check what has been done before. I think this
11 is not a good way to go. You end up being a modifier rather
12 than an innovator if you check what everybody else has done.
13 It influences your thinking.

14 Q Did I hear you say not a good way or another
15 good way?

16 A It is not a good way. A typical example of this
17 is my tape recorder design in England.

18 Q You did not look at what was done before then
19 there?

20 A I was not allowed to and --

21 Q Was that design a success?

22 A Well, the first one was submitted to the Council
23 for Industrial Design and it got panned, I am afraid. And
24 I did a redesign of it about a year later and it was put in
25

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Hutchings-cross

redirect

the permanent exhibition of the Council for Industrial Design in Shaftesbury Avenue in London as the best example of a British-designed office tape recorder.

MR. JANICKE: I have no further questions.

REDIRECT EXAMINATION

BY MR. BRADLEY:

Q Mr. Hutchings, you indicated that Plantronics had made a bid on the Bell 61 and 61A headset, and they didn't receive the contract on that, is that correct?

A Yes, to the best of my knowledge. We prepared a bid. The same task force that went into the headset design.

nd 1B

Q Were you personally involved in that?

A Yes.

Q Do you recall approximately when it was?

A I haven't a clue. We got all the information together and then the financial wizards get cracking on it after that. We provided the information.

Q Would that have been months before you started or a year before you started on this project at the end of 1968, do you recall?

A I can't recall. It was some time shortly before. How long does Bell take to come back and tell you whether you have got it or not? I don't know.

Q One of the things that we discussed before was Exhibits X1 to X5. This is in connection with another witness. This was a letter from Mr. Graham as president of Plantronics to Mr. Schiavoni of AT&T, with attachments I to IV.

Did you participate in the preparation of any of these attachments?

A I don't know. I haven't seen them.

Q One is X5, which is called the Evolution of the KS-19796 Headset, and it has in it --

A Is that the MS50?

2 Q I was just going to show you an index which
3 shows various models that Plantronics had made in the past.
4 One is MS57, MS43. The MS43 is the under the ear version
5 of the behind-the-ear headset, the MS51 which was the in-the-
6 ear version --

7 A I don't associate the numbers.

8 Q And the MS50 --

9 A I know that one.

10 Q -- which is the clip-on version

11 Did you participate in the preparation of this
12 exhibit, X5?

13 A To the best of my knowledge, I have not seen this
14 before at all. I have seen some of the contents. I have
15 seen the pictures of this and the picture of the girl here
16 and I have seen this in some literature for somebody we
17 supplied a helmet mounted headset for. Of course I know
18 this one. Some of the pictures I recognize, but the text,
19 I don't recall having had anything to do with that at all.
20 That looks like a sales department effort.

21 Q You didn't participate in the preparation of
22 this, which would have been presumably in the early part
23 of 1967? I am not sure whether you were with Plantronics
24 then or not.

25 A Can I have a look? I have got it down here.

1
2 Q Sure.

3 A April, '67.

4 Q April, '67. So, then, it seems to be pretty
5 clear you didn't participate in the preparation of this?

6 A I was a tiny cog in the wheel at that time.

7 Q The following year, which would be, let's say,
8 December of '68, which would be a year and a half or so,
9 almost two years later, and there was an effort to then
10 produce a headset and various versions were looked at, wasn't
11 this document made available to yourself?

12 A I don't recall having seen it before at all.
13 I think I pointed out to you earlier that the documentation
14 system at Plantronics left a lot to be desired about that
15 time. That is why I had to redo it completely.

16 Q You mentioned that you had discussions with Mr.
17 Graham, and I show you a letter from Mr. Graham dated March
18 27, 1962, which was long before you joined the company,
19 to Mr. Barney Langford of Audotone, and I believe you indi-
20 cated that when you spoke to Mr. Graham about behind-the-
21 ear headsets he didn't mention any particular versions
22 to where the voice tube would be located?

23 A No. He just said, "We tried that before and
24 it was unstable."

25 Q I refer you to this letter and see if this

2 refreshes your recollection at all, and particularly he is
3 referring here to a behind-the-ear mounting in this
4 letter. Here he says post-auricly. In the second para-
5 graph he ays -- which of course is not directed to you,
6 the letter, but I just wondered if it refreshed your recollec-
7 tion as to what he may have tried before -- he says, "I
8 have tried several tube mounting configurations from the
9 top of the capsule and from the bottom of the capsule with
10 heavy and light tubes and have found that in order to
11 solve the balance problem that the tube must be very, very
12 light at its outward extremity."

13 Do you recall whether he mentioned to you that
14 he had tried both over-the-ear and under-the ear?

15 A No, it was a sort of disclaimer, "We tried
16 that before."

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1 2b am gwrfl Hutchings-redirect

2 Q Do you agree with his statement here that, "In
3 order to solve the balance problem the tube must be very,
4 very light at its outer extremity"?

5 A The tube should be light. The whole headset has
6 to be light. We are talking about a headset of less than
7 an ounce so we can't have very much weight anywhere.

8 Q How about the tube at its outer extremity, is it
9 true it must be very, very light?

10 A Yes. As I said, it is a headset where we will
11 end up with less than an ounce.

12 THE COURT: Way out at the end of the tube is
13 because of the leverages and it has more significance than
14 anywhere else, I imagine.

15 THE WITNESS: Yes, sir.

16 Q One other point.

17 It is your recollection that Mr. Graham made
18 the trip with perhaps some others to San Francisco and that
19 was when the Oticon hearing aid was obtained?

20 A Yes.

21 Q We referred yesterday to a date early in January
22 as to when this headset was obtained by that date and we
23 also have an answer to another interrogatory relevant to the
24 same question as to when -- this is interrogatory 95 --
25 "When did plaintiff or any one of its employees, agents or

1 gwrf 2 Hutchings-redirect

2 attorneys learn of each of the following reference," and
3 one is the Oticon hearing aid and the answer is "1968."

4 I am wondering did you have the Oticon hearing aid
5 at the time you made the first drawing which is in Defendant's
6 Exhibit CC which has the two tubes coming out over the ear?

7 A I don't think so. I am pretty sure I didn't.
8 There was a memo that I believe I wrote about what we were
9 going to do.

10 Q You mean your notebook pages?

11 A No, there was a memo. I can't remember what exhibit
12 it was. You know the memo where there are a number of
13 different tasks that were going to be performed that I was
14 already laying out.

15 MR. JANICKE: The engineering meeting notes?

16 THE WITNESS: Right. I was already laying this
17 out. To the best of my knowledge, the trip to San Francisco
18 came after that. But, as I said, to the best of my
19 recollection.

20 Q So you don't recall this particular headset
21 which would be, to identify it, page 1 of Defendant's Exhibit
22 CC, this layout which is dated December 30, 1968 --

23 A Right. If you will notice --

24 Q Let me finish the question. You don't recall
25 that that layout was in fact based upon a hearing aid

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of the same configuration?

A No. This was based on this one, this shape.

Q The shape was based upon the Audiotone one to the left of the same drawing?

A Right. If you take this piece off the top here, you will notice this looks something like that. I am bringing the other tube out over the top of the ear tube. These are, as you understand, preliminary thoughts.

Q Yes. You understand my question wasn't directed particularly to the shape of the capsule but it was to the configuration of bringing the two different tubes out over the ear, which is very similar, is it not, to the Oticon hearing aid?

A yes, and there are others I believe that are like
this.

Q What I am trying to determine, if we can from your recollection now, is whether you had access to one of those or whether you actually copied that from one of those at the time you made this drawing in December of 1968.

A No.

Q But I take it from the fact that Mr. Graham was on a trip where the Oticon was secured that he was aware of the Oticon and its configuration at that time?

MR. JANICKE: I object to the question, your

1 gwrf 4

Hutchings-redirect

2 Honor, as calling for what Mr. Graham was aware of.

3 Q Do you know whether he was aware of it or not?

4 THE COURT: As rephrased I will permit it.

5 A Whether he was aware of it when he went to San
6 Francisco or when he came back from San Francisco?

7 Q When he came back.

8 A He should have been aware of it. He came back with
9 it in his hand. He is pretty smart.

10 MR. BRADLEY: I trust the objection is withdrawn.

11 Q You also indicated when the project began you sat
12 down and thought about it and you mentioned the Audiotone
13 hearing aid to which you added a voice tube from the MS-50?

14 A Right, this thing here.

15 Q Right. I am wondering, do you recall how long
16 it was that you sat down and thought about it? I don't mean
17 minutes but just --

18 A No. I can tell you it wasn't long. We must
19 have some sort of record in the dates on these drawings.
20 What was the date of the meeting?

21 Q December 21, 1968.

22 A December 21st I had already started a layout
23 here. So from whenever we first started thinking about it
24 until December -- was it December 21st?

25 Q December 21st was the meeting.

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1 gwrf 4a

Hutchings-redirect

2 A I was already doing a layout then, so from when
3 we decided we have to do something until then was as long
4 as I had.
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Hutchings-redirect

2 THE COURT: Excuse me. The question a moment ago
3 was whether you had access to an Oticon hearing aid at the
4 time you made the drawing of December 30, 1968 and you said
5 no.

6 Yet, you said, that when this other gentleman came
7 back from a San Francisco meeting of December 21, 1968,
8 he had it in his hand.

9 THE WITNESS: The meeting on December 21st said
10 that they were going to, they were going to San Francisco.
11 They hadn't been there yet.

12 THE COURT: When did he come back?

13 THE WITNESS: After they went, I don't know how
14 many days later this wa .

15 THE COURT: Well, it was before the 30th of
16 Decmeber when he came back with it in his hand, wasn't it?

17 MR. BRADLEY: The testimony yesterday was a few
18 days after the meeting but it wasn't very definitive.

19 THE WITNESS: I don't know what the actual date
20 was.

21 THE COURT: Well, it was probably before the 30th,
22 wasn't it?

23 THE WITNESS: It could have been, your Honor.

24 THE COURT: Well, if he had it in his hand and you
25 saw it in his hand, you had access to it --

1 THE WITNESS: He came in with it on his hand and
2 he dumped it on my drawing board.

3 THE COURT: Well, that is access.

4 MR. JANICKE: I believe we have an invoice for
5 that for January 6th. Isn't that the documentation,
6 invoice for the Oticon?

7 THE WITNESS: There should be.

8 MR. BRADLEY: I don't recall.

9 THE WITNESS: It was purchased on sight. They
10 went out and purchased it and paid for it and there should
11 be some record for it.

12 MR. BRADLEY: If there is an invoice, I don't
13 recall it.

14 THE COURT: Well, then, it wasn't purchased at the
15 time of the December 21st meeting then, if it was purchased
16 on January 8th.

17 MR. JANICKE: It was definitely after the meeting
18 that they went to San Francisco. I think we can document
19 exactly when the purchase was.

20 THE WITNESS: If that is what the memo says.

21 MR. BRADLEY: I didn't have any specific knowledge.
22 I know the meeting was December 21st and I just recall
23 the witness testified yesterday they went to San Francisco
24 a few days later.
25

THE WITNESS: It is six years ago. A few days plus or minus.

Q Was this project at this time starting somewhere around December 21, 1968, your first attempt to make a behind-the-ear headset?

A Yes.

Q And you had both versions that we have discussed, two tubes over the ear and the voice tube over the ear and ear tube under the ear by January 4th, is that correct?

A Yes.

Q We mentioned the 841 patent, I'll have a copy in a minute, which was your patent with the two tubes over the ear. Did you make any presentations on that or prepare any papers on that at any time let's say during 1969?

A Not to my knowledge. What do you mean by papers?

Q I mean giving a paper at a trade association meeting.

A I have never given a paper at a trade association meeting.

Q I was just wondering, as far as you know was the first publication dealing with this headset at the time this patent issued, which would have been 1971?

A What is the question?

Q Were there any publications of this configuration

2 of headset prior to the time this patent issued in 1971 as
3 far as you know?

4 A As far as I know, no.

5 MR. ARNOLD: Would you read back the last question
6 and answer, please. I'm not sure I caught the significance
7 of it yet.

8 (Question read.)

9 MR. ARNOLD: My question is, it seems to me there
10 is an ambiguity. We know of the third quarter stockholders
11 report and of the July 7th special message to stockholders.
12 Excuse me. I'm on the wrong one. I'm looking at the wrong
13 set. I beg your pardon. I'm with you.

14 Q We talked about the counteracting torque considera-
15 tion and I guess that is also -- I shouldn't say I guess, I
16 should say this is also mentioned in this patent, the '841
17 patent.

18 A Yes.

19 Q Is that present in the construction shown in the
20 '841 patent just the same as it is in the construction shown
21 in the patent in suit?

22 A Almost but not quite because you have got this
23 anchoring around the back here on the other patent. It
24 is coming over the top on this one. It is almost the same.

25 Q I mean as far as the voice tube producing any

2 counterbalancing, torque, that aspect of it, is it true as
3 much with the '841 patent as it is with the Hutchings patent
4 in suit?

5 A I would say so, yes.

6 Q You mentioned just a few moments ago that the
7 port location, and I think you were referring to the port
8 location on the hearing aids, was -- bore no relation to
9 what you were doing at the time?

10 A Right.

11 Q Could you explain what you meant by that?

12 A Well, a hearing aid, you are picking up ambient
13 noise. It is unfortunately the hard of hearing have to
14 put up with this but you pick up the ambient noise plus
15 what you are trying to listen to. This will be useless
16 if you try to put it over a telephone line so obviously you
17 can't use the same port locators. You have to have your
18 ports, particularly the microphone port, very, very close
19 to the mouth. Otherwise you are getting lots of extraneous
20 noise.

21 Q But in terms of adding a voice tube to a microphone
22 port so as to make a headset, it would be relevant
23 where that microphone port was located in the first place,
24 would it not?

25 A Yes.

1 Q The last point I had was that I didn't quite under-
2 stand your experiment of standing on your hands and you may
3 have been speaking figuratively. Was this a headset that
4 was --
5

6 A It was this.

7 THE COURT: The hearing aid with a voice tube
8 added just for purposes of demonstration.

9 Q I'm not sure, how did that stay on your head when
10 you were upside down?

11 A Well --

12 Q I don't mean for you to demonstrate --

13 A It's six years later. I'm past that sort of thing
14 now. What I'm doing actually is, I'm up on a chair like
15 this and I put my feet up in the air.

16 Q So you weren't vertically with your head down?

17 A No.

18 Q Your body was out sideways?

19 A Right.

20 Q Because there is no attachment --

21 A My body was up. My body was up.

22 THE COURT: But your head wasn't down?

23 THE WITNESS: My head wasn't like this. Obviously
24 when you are doing a handstand like that, your neck is back.
25 Let me try. Not a handstand. About like this.

THE COURT: I see.

Q In other words, your head was horizontal, I don't know exactly how to describe it, your face was facing downward rather than your face facing sideward so the bottom of your head would be --

A The bottom of the head wasn't down. The next was back.

MR. BRADLEY: I have no further questions.

RE CROSS EXAMINATION

BY MR. JANICKE:

Q In response to one of the questions of Mr. Bradley, you mentioned an anchoring effect of the receive tube. I would like you to explain what that means when you have the receive tube on the bottom.

THE COURT: That was explained by a previous witness because the stiffness of the tube will tend to keep the bottom part of the case in position.

THE WITNESS: Right.

MR. JANICKE: No further questions.

THE COURT: All right. Thank you.

(Witness excused.)

MR. BRADLEY: The defendant calls Mr. Mol.

2 H A N S C O R N E L I U S M O L,

3 called by the defendant, having been previously
4 duly sworn, testified further as follows:

5 DIRECT EXAMINATION

6 BY MR. BRADLEY:

7 Q Mr. Mol, I believe you discussed your educational
8 background previously in connection with your testimony here
9 so we won't repeat that.

10 I understand you joined Roanwell in approximately
11 April of 1969?

12 A That is correct, as I recall April 1, 1969.

13 Q And I don't know if you mentioned the approximate
14 date when you left?

15 A March '74.

16 Q Were you a corporate officer --

17 A March '73, I beg your pardon.

18 Q Were you a corporate officer during the time you
19 were there?

20 A No, I was not.

21 Q Have you had any further association with
22 Roanwell since the time you left?

23 A None whatsoever.

24 Q I hand you Defendant's Exhibits L-1 to L-3 and
25 M-1 to M-3, which show the R-70 and R-71 headsets and i

ask you if you would just briefly explain these headsets and making reference to these documents where it will be helpful. Perhaps you can explain the R-70 first.

A The R-70 as shown in L-1, L-2 and the physical specimen in L-3 is a behind-the-ear headset with the voice tube over the ear and the receiving tube under the ear.

It has a connector type of attachment, a slidable speech tube.

The other model which is shown in M-1 --

Q Before you leave the R-70, one point I'd like to ask you about.

On the Exhibit L-1 there is shown what appears to be a hook of some sort at the bottom?

A Oh, yes, the stabilizer hook.

Q What is it called?

A A stabilizer hook.

Q What is the purpose of that?

A It helps in stabilizing a headset in an unusually receiver application or on an operator or person who may not get satisfactory stability because of either an extreme ear size, either large or small, primarily small.

Q Would you explain the R-71, please.

A The R-71 is -- as shown in M-1 and M-2 and the physical specimen in M-3 is a behind-the-ear headset

2 with the voice tube coming out under the ear, the receiving
3 tube over the ear, a connector and a stabilizing hook on the
4 bottom.

5 Q And again, what is the purpose of the stabilizing
6 hook?

7 A It is the same purpose as I have described before.
8 For certain operators, it helps in stabilizing the headset
9 more than would be otherwise.

10 Q I might mention that in the original photograph,
11 the stabilizing hook is a little bit clearer to see than
12 it is in the copies of it.

13 Can you describe the relative advantages and dis-
14 advantages of these two headsets as they appear to be
15 advantages or disadvantages in your opinion?

16 A Well, as we started designing these headsets we
17 became aware that there was a compromise between comfort and
18 ease of donning. The headset which we found to be easiest
19 to put on, a single piece with no adjustment features to speak
20 of or very few was by far the easiest to put on.

2 Q Which was that?

3 A This was in essence the 70, the over-the-ear
4 voice tube version. It had no adjustability in terms of
5 the plane as I described yesterday, or the day before yester-
6 day, with the side of the head, the plane described by the
7 side of the head near the ear and the plane described by
8 the, in the cavity behind the ear. But it was very quick
9 to put on and it did, in fact, fit a sizable percentage
10 of people reasonably comfortably.

11 The 71 was a version which had more adjustment
12 and more difficulty of putting on but had the advantage of
13 having more adjustment and consequently we felt more
14 potential of fitting a larger segment of the number of opera-
15 tors.

16 We felt that both were viable headsets, each of
17 which had a distinct advantage of one kind over another,
18 and somewhat of a disadvantage.

19 Q There has also been some discussion of the
20 Bell 61A, which I understand to be a headset that is mounted
21 on a ear mold within the ear, is that correct?

22 A That is correct, sir.

23 Q Did Roanwell supply this headset and also call
24 it the R61A?

25 A Yes. We sold the headset to independent tele-

2 phone companies and whoever else wanted it and then put in
3 the prefix R61 to designate it as being a Roanwell product,
4 which had been our custom.

5 We were allowed to do by Western Electric. We
6 manufactured it under license.

7 Q Do you know how the comfort of the 61A compared
8 with the comfort of the R70 or R71?

9 A Well, the comfort of the 61A is far greater than
10 either, I believe, the 70 or 71. It is quicker to put on
11 and take off. It takes a very simple motion to put in and
12 out.

13 It does require a custom molded earpiece and when
14 the earpiece was molded properly by a skilled individual
15 such as a good hearing aid dealer, our results and those of
16 Bell Laboratories, as we spoke to them, was that it was an
17 extremely comfortable headset. It could be worn for many
18 hours. The operators liked it very well.

19 Q How did it compare with the other two acoustically?

20 A Acoustically the 61 was superior, we found.

21 Q Why was that?

22 A Well, the transducers basically were designed,
23 first of all, to be in the 61 shape, so that the diameters
24 and shapes of tubing were optimized against the transducer
25 a little bit better and the closer coupling into the ear

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was a very desirable characteristic. In other words, the transducer in the 61 is much closer to the ear and consequently gives a higher output level. It has a shorter acoustic tube without resonances and the resonances in a receiver by and large are very undesirable characteristic.

So it was a cleaner output curve. It was just a simpler, better headset to build acoustically.

Q What were its disadvantages?

A Well, the disadvantages, one of logistics primarily. It is a big headache to an operating telephone company to adopt the 61 headset and consequently, embark upon a very long program which commits them in essence to custom-fit operators.

Q What about the cost of the ear mold?

A The cost of the ear mold is substantial, so the 61A headset was, by the time the two ear molds were supplied to the operator, and of course I don't know what it cost the Bell System in their own lost time, it was an expensive headset. But once the operator had it, they loved it by and large.

Q Are either the R70 or R71 headsets attached to any intermediate support means on the head, such as a headband or anything of that nature?

A No, sir. They are not intended to. They were

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not intended to be done that way.

Q Approximately when was your first association with the R70 or R71 headsets or any projects concerning them?

A I think it started just about a very few months after I joined Roanwell. I think the specific dates on which we started that I can trace were somewhere late July, early August specifically.

Q And how do you fix those dates?

A Well, I remember being on the project during the vacation shutdown. I stayed around. I had taken off three or four weeks vacation to bring my family across the country because I had just joined Roanwell and that was during late June and the early part of July and, as I re-joined them, quite a bit of work had been done, sketches.

Just about as soon as I got back we got involved
and brought
very similarly to the other testimony. We went out / hearing
aid cases and tried to find out what the shapes were, what
other people had done.

Again, to not reinvent the wheel.

MR. ARNOLD: I believe there is an ambiguity I would like clarified. This trip late June, early July was a trip with your family?

THE WITNESS: Yes, sir. I had come from the

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1 West Coast. I was hired from Los Angeles and consequently
2
3 I had to transport my family and my goods across the
4
5 country, so there was a time period of three or four weeks
6 when I wasn't in the area, so I do remember very distinctly
7 when I came back going with the hearing aid cases and I
8 recall seeing sketches which we had talked about.

9 Now, my recollection is not totally clear as
10 to the exact degree of involvement I had just prior to my
11 leaving to go across the country.

12 I believe we had talked about the concept of
13 doing something like this and primarily this was limited
14 to analyzing the size of the transducer and saying, "Gee,
15 what can we do with these in order to get a small package."

16 Beyond that, I don't recall anything specifically.

17 Q I would like to clarify another point. You said
18 just as was discussed in the other testimony. What are
19 you referring to?

20 A Oh, I am sorry. I shouldn't have referred to
21 that. Mr. Hutching's testimony.

22 Q At the time of this activity, were you aware
23 of any announcements or anything pertaining to a proposed
24 headset or an actual headset of Plantronics?

25 A Well, I must have been because there is certainly
 evidence in the record that I was the recipient of a

1 zb-6
2 Memorandum written by Mr. Potter stating that Plantronics
3 had a behind-the-ear headset.

4 I do not recollect specifically being fully
5 aware of this beyond just a verbal description behind-the-
6 ear headset.

7 I do know that I knew about a "behind-the-ear
8 headset" before I went on this vacation. That much I knew.
9 Beyond that I am not sure at all what I knew.

10 Q Well, I think the record indicates that there
11 was a memo July 24th pertaining to having an actual flyer
12 of the Plantronics headset and that is what you have reference
13 to as being on that circulation list?

14 A Yes.

15 Q But I was referring to the time before that.

16 A No. Before then I think the only thing I knew
17 was a vague general terminology of a behind-the-ear headset.

18 Q I show you a copy of Page 54 of Plaintiff's
19 Exhibit 140 which purports to concern a telephone conversa-
20 tion between yourself and Mr. Bernardi of Pacific Plantronics,
21 and I ask you whether you know when you called Mr. Bernardi
22 and also whether it was for the purpose of securing informa-
23 tion relevant to the new or proposed Plantronics headset?

24 A The only way that I can fix the time frame is
25 I remember making a phone call from my hotel room. I

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2 was hired or started in April, so during April and May and
3 probably the first week of June I stayed in a hotel in New
4 York City because we had not yet purchased our home yet.
5 I remember making the telephone conversation from the
6 hotel room.

7 My recollection isn't very clear whether it
8 was the first week that I joined Roanwell or the last week.
9 There is a time span of, I would say, a good five weeks
10 that I am not clear, but I do remember very distinctly
11 making it from the hotel room. So I think that is the
12 time frame that is very clear.

13 Q What time frame did you indicate for that?

14 A It would be somewhere around the May, early
15 June area.

16 Q What was the purpose of the call?

17 A The purpose of the call, frankly, was to hire
18 a capable transducer engineer because we had two problems.
19 First of all, we had the 61A headset program. We had
20 Mr. Morrison with us who I testified before, who expressed
21 a great desire to leave and to relax, and we felt very
22 strongly that we needed a good understudy to him, and
23 well as hopefully a man who was experienced in transducer
24 design and one of the first assignments that I received
25 when I became in charge of the engineering department was

1 zb-8
2 to try to staff it so we could handle the 61A program
3 properly.

4 Q But you apparently inquired of Mr. Bernardi
5 whether they were making their own transducers at PPI at
6 that time, is that correct?

7 A Well, let me clarify. I don't remember the
8 exact conversation, but the context in which I found out
9 that he was not working on transducers is the conversation
10 went roughly as follows. "I understand that you used to work
11 at Shure Brothers." In other words, I asked him his ex-
12 perience. He said "yes, basically that is my real experience."
13 I believe it was Shure Brothers. It was an outfit in
14 Chicago.

15 He said, "However, I haven't done any transducer
16 design ever since they hired me."

17 And I said, "Well, does that bother you?"

18 He said, "Well, I like electrical engineering,
19 but an awful lot of what I am doing is repackaging, et
20 cetera. I would like to get into transducer design again
21 because I think that is what my real strength is."

22 So I think he very much volunteered the informa-
23 tion he wasn't doing transducer design at the time. It
24 was not my prime call to elicit that information and I am
25 fairly sure that I did not ask him that question, are you

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1 doing transducer design. It came up naturally in the
2
3 conversation, but I was fully aware at the end of the con-
4 versation that obviously, unless he was lying and I had no
5 reason to believe that, that in fact he was doing absolutely
6 no transducer design.

7 He also expressed in the conversation his
8 happiness with Plantronics, they were a nice outfit to work
9 for, he liked California and he had no desire to come to
10 New York.

11 Q Did you follow up on any of the leads that
12 Mr. Bernardi gave you to contact others?

13 A Yes, he told me about a fellow, I believe he
14 worked with, at Shur Brothers, by the name of Austin Brouns
15 I believe.

16 Q It indicates Brouns here, B-r-o-u-n-s.

17 A And the reference that he gave me, as I recall,
18 was that Mr. Brouns at that time was with LTV in Santa Ana,
19 California. My recollection was when I called Santa
20 Ana, California, that Mr. Brouns had just been transferred
21 to, I believe it was Houston, Texas. It was some place in
22 Texas. LTV had transferred.

23 When I spoke to Mr. Brouns, I believe he either
24 had just been transferred and had been in TEXAS or was
25 about to be transferred to Texas, but he felt that during

1 zb-10

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2 this change, and hopeful promotion, that it wasn't an oppor-
3 tune time for him to make a change to New York City.

4 I suspect frankly he didn't relish the opportunity
5 of coming to New York either. Those circumstances made
6 him say no, he just wasn't really that interested. I recall
7 talking to him about twice. I think the first time he
8 said, well, he would like to think about it. When I
9 followed it up, I am pretty sure a few weeks later he said
10 no, he thought about it and no thank you.

11 Q So in any event, at one point you went out to the
12 hearing aid shops to look at some hearing aids and you say
13 this was during the vacation period and I believe there has
14 been some testimony that during 1969 that would have been the
15 last week in July and the first week in August, is that
16 consistent with your recollection?

17 A Yes, that I remember distinctly.

18 Q Before that period, had you done anything in the
19 way of sketching or anything in connection with this program?

20 A Yes. I am sure that we did, although it was, as
21 I explained before, largely limited to worrying about the
22 transducer area and how we could lay something in a small
23 capsule. They were not details showing outside cases or
24 anything of that sort.

25 End 3B

2

Q Do you recall whether you sketched anything

3

showing the voice tube either over the ear or under the ear.

4

A No. Frankly, that was the least of our concern.

5

I think the major problem in this headset design is to lay

6

out the size and orientation of the capsule, which par-

7

ticularly in our case was the big problem because we had

8

large transducers. It became very important. We did not

9

really give any serious consideration to over the ear or

10

under the ear as being a significant problem at that time.

11

Q Are you saying you did not sketch such configura-

12

tions or that you do not recall now?

13

A I simply do not recall having sketched anything

14

that pertained to over-the-ear or under-the-ear tubes

15

specifically. They were at best, as I remember, back-of-the

16

envelope sketches, scratch pads, blackboards or something

17

of that nature.

18

Q Following your trip to the hearing aid shop,

19

would you just state briefly what transpired next?

20

A I think the first thing that we did is we analyzed

21

the hearing aids that we had and in fact confirmed that they

22

were all pretty similar. I think we all confirmed that

23

there wasn't a single one that we could use as was, which

24

we sort of had a slight hope of being able to do. Really,

25

I think we took two transducers and the two halves of the

cases and held it and taped it together and held it in back of the ear and pretty well confirmed that the case as it was existing at that time simply wasn't usable.

Frankly, in order to get into business we hoped to buy a commercial capsule, adapt it and make our first product.

That turned out not to be practical.

Q At some point, as I understand it, you went to another company for some assistance in this development?

A Well, we went to Unex.

Q The Unex Corporation?

A Yes.

Q Where are they located?

A Waltham, Massachusetts, I believe, or very close to Waltham. Hawthorne.

Q I am trying to locate a copy of Plaintiff's Exhibit 74. I note this has a date on it of September 26, and it is presumably in the nature of a letter of agreement between yourself and Unex, is that correct?

A Yes.

Q So using that to fix the date when you had some kind of a letter agreement with Unex, had any models been made before this agreement with Unex?

A I remember a wooden model having been in

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process.

Q Do you recall when that was made?

A No, I do not recall specifically. I am sure that we had it a few days before our Unex trip for sure. It was a very crude model, but it showed the kind of things that we were after and the kind of problems we had. It was not functioning, did not contain transducers.

Q As far as you recall, was there just a single model, wooden model, before you went to Unex or more?

A As far as I recall, it was a single model. We felt we could establish what we wanted with a single model.

Q Do you recall who made the model?

A To the best of my recollection, it must have been made in the model shop in the engineering department. As I recall it, it was not made at my direction. I think what happened is the sales department, particularly during my vacation period, had asked some of our engineering personnel, which was a very common practice at that time, to make them something, and I think it was in essence a model that looked like the StarSet.

Q Do you recall any contacts with Mr. Foley in connection with that model?

A Mr. Foley was really responsible for putting work into and out of the model shop at that particular

1 time and any other department that wanted model work
2 made or fixed would generally go to Mr. Foley to ask him
3 to get this done.
4

5 Q I was wondering if you recall any particular
6 incident that occurred with relation to that model and
7 Mr. Foley?

8 A Well, I remember Mr. Foley walking into my office
9 the last few days of Mr. Novelli's employment and walking
10 in showing me the headset. My reaction was it was probably
11 not the first time I was aware that they were making a
12 model, but I think it was the first time I ever saw the
13 model, and Jim was kind of proud of what he had done or
14 what his group had done, and came walking in with a big
15 smile on his face. I didn't smile.

16 Q Why not?

17 A Well, Mr. Novelli was there. He was leaving to
18 Plantronics. We knew Plantronics was working on a behind-
19 the-ear headset and we felt there was very little point in
20 informing them that we were thinking about the same thing.
21

22
23
24
25
End 4A

1 Q I have a copy of Mr. Novelli's work record with
2 Roanwell and I wonder if you could determine from that the
3 date that he left Roanwell.
4

5 A I would guess from this paper 8/29/69, the last
6 day of August.

7 Q Did you give Unex any directions as to what
8 configuration headset to make in terms of whether the voice
9 tube would be located above the ear or below the ear?

10 A Well, that is very difficult to answer. We did
11 not give them specific directions in what needed to be done,
12 but there were two sets of directions we gave them.
13 I think the first one was, and probab y the most important
14 one, to help us in making as quickly as possible a
15 functioning model. We did not specify over the ear or under
16 the ear or through the ear or what.

17 We wanted a functioning model that we could try
18 out and demonstrate and ascertain what problems we would
19 have, if any.

20 The second thing that we wanted them to do is help
21 us in doing the basic design work on one of those capsules,
22 the detail design.

23 When we went to Unex and when they expressed their
24 willingness to work with us, one of the reasons we went to
25 them, frankly, is because they were a hearing aid

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2 manufacturer as well as a plastic molder and they had
3 all sorts of molds, and we had hoped, as I expressed before,
4 to use already existing tooling, or hopefully with slight
5 modifications thereof, to get a headset into production or
6 at least into engineering test or prototype as quickly as
7 possible.

8 It turned out that Unex had in fact hearing aid
9 molds that they had collected over the years and they had one
10 in particular that they weren't using any more and it, with
11 fairly minor modifications, could be made into a useful
12 mold very quickly.

13 I think this is how we went after the under-
14 the-ear approach first, mainly because they already had a
15 mold that lent itself much quicker to modification than
16 deliberately going over the ear. The going over the ear
17 focus would have been a deliberate deviation that went
18 contra to what we were trying to obtain, which is a quick
19 sample.

20 It is much harder to modify a mold with all the
21 curvatures to go over the ear than it is under the ear.
22 Their particular hearing aid already had a receiving tube
23 that went over the ear, so that portion we could essentially
24 leave alone with some modifications. It was only the bottom
25 portion that needed modifying.

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2 We tried to use, if at all possible, the voice tube
3 socket -- what we called the socket -- which has since been
4 referred to as a vibration isolator, as well as the transducer
5 and, if possible, use the same mounting means, and that seemed
6 to be feasible.

7 Q Did you supply them with layout drawings?

8 A We supplied them with two sketches, as I recall,
9 which also happened to go under the ear, and I think the
10 reason that that essentially went that way is because the
11 hearing aid cases that we picked up happened to be very similar
12 to the Unex hearing aid case which went over the ear.

13 Q When you say "over the ear" --

14 A Over the ear voice tube. I will try to be more
15 specific.

16 Q You mentioned going over the ear. You meant the re-
17 ceive portion?

18 A The receive portion of the Unex case as well as
19 the ones we bought commercially were designed to have the
20 receiver go over the ear rather than the microphone port.

21 Q Were you at the time familiar with any literature
22 showing behind-the-ear headsets with voice tubes under the
23 ear?

24 A No, sir.

25 Q Were you familiar with the Flygstad Patent?

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2 A No.

3 Q Did you at this time yourself prefer either the
4 under-the-ear or the over-the-ear approach? I am now speak-
5 ing of the voice tube.

6 A Well, there are two reasons for preferring to
7 do something, and I would like to keep them distinct, if I
8 may.

9 It was my assignment to get a prototype made
10 as quickly as possible, and certainly the under-the-ear voice
11 tube approach was my quickest way of getting to the end
12 target, which is to get a working model, so I preferred
13 it certainly for that reason.

14 We embarked on a program almost simultaneously
15 that Unex was trying to change their molds with an analysis
16 of the various ways we could accomplish that. I think my
17 testimony the other day in questioning brought out circular
18 capsules and all sorts of capsules.

19 But we recognized that a simple over-the-ear one
20 was going to be more of a problem for us to produce and
21 would probably -- and I don't know the exact timeframe where
22 we firmed it up. This is kind of like a pyramid. The longer
23 you think about it the more firm you become in your con-
24 clusions. We became aware that the single piece, non-adjust-
25 able kind which tends to be the over-the-ear voice tube type,

1 gwrf 5

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2 had human factor problems that needed a little bit more
3 resolution.

4 Q I really wasn't asking you the reason, Mr. Mol.
5 I was asking you at that time that you went to Unex, did
6 you prefer personally one or the other?

7 A I hadn't really thought about it to that detail at
8 all.

9 Q Did you at sometime shortly thereafter or within
10 the time of this program come to prefer one or the other?

11 A Yes, I think I have generally favored the under-
12 the-ear voice tube approach both from a time standpoint
13 as well as what I felt a better technical performance and
14 human factor standpoint.

15 Q What do you prefer today?

16 A I still do prefer that version today.

17 Q Do you know whether the over-the-ear voice tube
18 version had been rejected at the time of this agreement
19 with Unex?

20 A Oh, no.

21 Q That it had been rejected by Roanwell or people
22 at Roanwell?

23 A No, it had certainly not been rejected as a valid
24 concept. In no way.

25 Q Was it deemed to be an inoperative device?

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2 A No.

3 Q You have expressed your view.. Do you know whether
4 others in engineering had different views than yours as to
5 what they preferred?

6 A I know we had quite a few discussions, and I re-
7 member that some people preferred the over-the-ear version,
8 other people preferred the under-the-ear version, and I
9 think both sides pretty well understood the advantages
10 of one over the ear and it was a matter of judgment as to
11 what the best long-range thing would be.

12 Q I hand you a copy of Defendant's Exhibit O-1 and
13 O-2 and I ask you if you would explain what they show,
14 and again just briefly.

15 A They show a sketch of a behind-the-ear headset
16 with both the transmitter and receiving tubes going over
17 the ear.

18 Q Do they both show that?

19 A Yes, they both do.
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1 Q I believe these are attached to Plaintiff's
2 Exhibit 140, attached to a Unex report and I have forgotten
3 the exact date of that report but it is sometime in the fall
4 of 1969.
5

6 MR. ARNOLD: This is a second Unex report dated
7 October 21, 1969. The particular drawing sketch 19 was page
8 85 of our Exhibit No. 140.

9 MR. BRADLEY: Thank you.

10 Q I ask you whether at that time you had any
11 information from any other source as to putting two tubes
12 over the ear?

13 A No, sir. The first time I saw this and discussed
14 it, I believe, is with this report.

15 Q Do you know whether Unex had any other information?
16 I don't know whether you have any basis for knowing that.

17 A I have no basis for knowing. I am fairly sure
18 I did not discuss it specifically.

19 Q Do you know that they did have information from
20 some other source --

21 A No, I do not know for sure that they had information
22 from another source.

23 Q You hadn't seen anything that corresponds to
24 what is in the Hutchings '841 patent, which is Defendant's
25 Exhibit S, had you?

2 A No, sir.

3 Q And by that I don't mean the patent document but
4 I mean any drawings or any material --

5 A Anything approximating it or -- no, I wasn't
6 familiar with that.

7 Q Were models and working units ultimately made of
8 the different configurations and here I am talking
9 particularly about the configurations with the one for the
10 voice tube over the ear and one with the voice tube under the
11 ear?

12 A Yes. I do know that Unex made some models for
13 us. I think they were primarily cemented together, cases,
14 wherever they could. And some little molded editions
15 and maybe some wood. They were not very sophisticated
16 but they certainly did have the capsule shape and outline.

17 Q Were comparison tests made on these models?

18 A Yes. Unex first of all took, as I believe, all of
19 their female and male employees and tried to come up with
20 some sort of a rating system of all different types. I
21 think there were about five or six different types to my
22 recollection. And it included categories such as comfort
23 and ease of putting it on, visual appeal, I think stability,
24 and they had a numbering system of some sort as to who pre-
25 ferred which one first, second, third and fourth.

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It wasn't a terribly sophisticated system but it was a fairly good analysis that gave us some rough ideas as to which seemed to be the most likely candidates.

Q Do you recall which was preferred as between the two?

A I think pretty strongly the under-the-ear version was preferred in the summary report.

Q Was the length of the voice tube something that you considered or your group considered as being a significant factor in determining whether to go to a voice tube over the ear or a voice tube under the ear?

A No, I don't think we gave it any importance whatsoever.

Q Do you recall whether you discussed it?

A Well, the method in which we discussed length of voice tube was largely related to having an existing transducer and tube combination on the 61, and knowing that that tube configuration length would have to be changed and that we would have to compensate slightly, particularly in cross over areas, or we might have to in order to duplicate the 61 curve. There was never any concern that we could make a very viable headset.

Our primary concern was how close could we get to the performance characteristics of the 61-A, which Bell

2 basically by then being the publisher of the desirable
3 characteristic, would probably evaluate our proposed sets
4 against, so we knew that there would be some small difference
5 in resonances in all likelihood and we had to minimize it
6 but there was never any doubt in our mind that was a fairly
7 straight-forward simple acoustical job.

8 Q Would, in your opinion, the difference in length,
9 whatever it might be, between the voice tube over the ear
10 in the behind-the-ear headset and the voice under the ear
11 have led someone in the 1968 or '69 period to reject one
12 or the other?

13 A That is a very broad question. I suppose somebody
14 might have rejected it but I think by and large none of the
15 people I worked with and that was the only frame of
16 reference that I had --

17 Q Well, I shouldn't say anyone. Generally I am
18 talking about someone that is skilled in this art.

19 A Oh. Certainly the people I was familiar with
20 skilled in the art didn't even consider this any kind of
21 a problem because they knew that the damping that is
22 introduced in the voice tube in order to eliminate and
23 reduce the resonances to get a smooth curve was a far
24 more important characteristic than the diameter on the
25 length of the tube by itself. And that with proper damping

2 one masks it over.

3 Q I show you curves which we have discussed briefly
4 before shown in Defendant's Exhibit XX-1 and XX-2 and I ask
5 you if you were present when these curves were run?

6 A No, was not present when these very curves were
7 run, sir.

8 Q Did you take any steps to verify this data or did
9 you not?

10 A Yes. This past Tuesday morning, I believe it is,
11 I went to Roanwell early in the morning and witnessed
12 running of identical data. We basically performed the very
13 same test that was concerned here. There was no surprise
14 whatsoever. This is the data as I clearly remember it, having
15 been -- when I left Roanwell years ago, but I confirmed
16 that these curves are a very accurate representation of
17 what I saw. There are very minor differences.

18 Every headset has a small shift here or there or
19 bump here or there. But this is very representative of
20 what I saw on Tuesday morning.

21 Q There are two things I would like you to comment
22 on here briefly. One is the difference in one of these
23 headsets, be it the R-70 or the R-71 between the effects on
24 lengthening the voice tube, I understand the voice tube
25 is telescoping in type, lengthening it to its full extent

or retracting it to its complete extent.

A Yes.

Q And the other point is 9-L the relationship between the output in the R-70 and the output in the R-71. Could you briefly -- I am trying to emphasize the briefness because some of this has been discussed before.

A Basically on XX-1, which reflects the R-70, the two curves in question, that is, with the speech tube fully extended and fully retracted, are labeled as curves 2 and 1 respectively. On my copy the dotted black and solid green. And except for maybe 1 db difference in an occasional frequency and a slight shift of maybe a few hundred cycles in the 1800 cycle region, there is essentially no difference for all practical purposes. I think the differences here are almost less than would be found on variation between headsets.

1 Q That is not clear. What do you mean variation
2
3 between headsets.

4 A Well, each headset has a transducer that has
5 a slightly differently characteristic. The stiffness of
6 the diaphragm might change. The acoustic resistance isn't
7 identical so every transducer is not identical to the other
8 one, and consequently, when one builds the headset, there
9 are slight shifts. I am saying the shift between headsets
10 is probably greater than the shift that I have seen here
11 by extending or contracting the voice tube.

12 Q Do you mean as between one R70 that comes off
13 the assembly line and the next R70 that comes off --

14 A That is what I meant. All the same model.

15 The similar comments apply to the 71 as a head-
16 set all by itself. Again, the variations are very minor,
17 on the order or less than normal expected variation. And
18 the final transducer characteristics of the two headsets
19 are for all practical purposes the same.

20 There are different resonance points between
21 the two headsets. as would be expected. But the overall
22 net level is very similar.

23 Q Well, taking, let's say, XX1, and ^{lvs} Cuvers 1 and
24 2 where there is damping present, could you hear the
25 difference between the performance when it exhibits Curves

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2 1 or 2?

3 A I have never met anyone that could claim to
4 hear this type of a difference. I think this is strictly
5 laboratory type of information that can't be heard by
6 the average person or any person.

7 Q How about going to Curves 3 and 4 on the same
8 paper, XX1, where they are undamped and we see that the
9 resonance points shift. Apparently the bandwidth is the
10 same. Could you hear the difference between headsets
11 that had the characteristics 3 and 4?

12 A I don't think that anyone could hear the differ-
13 ence.

14 Q And is the same thing true with regard to Curves
15 1 and 2 and Curves 3 and 4 on XX2?

16 A Yes, I'd say even more so. I think on XX1 --
17 it is very hard to integrate the curve but there might be
18 a slight reduction in volume in 1, but I think the average
19 person wouldn't even hear that. That is not true in XX2,
20 XX2, I think the volumes would appear to be almost identi-
21 cal.

22 Q The volumes in what?

23 A The output out of the headset basically.

24 Q Which headset are you referring to?

25 A Curves 3 and 4, XX2. The peaks are about at

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2 the same height. The dips are about at the same depth.
3 Only the resonant point has shifted somewhat.

4 Q When you were referring to there might be a
5 slight difference in level going back to XX1, you were again
6 referring to Curves 3 and 4?

7 A Yes.

8 Q As between the XX1 and XX2, let's take any one
9 curve, like Curve 1. Could you hear the difference between
10 the performance of the headset that had the Curve 1 on
11 XX1, or had the Curve 1 on XX2?

12 A I don't think so.

13 Q The curves that are closer here are the Curves
14 1 and 2 with the damping, is that correct?

15 A That's correct.

16 Q I show you a copy of Defendant's Exhibit C, which
17 has the Olney patent behind Tab 2 and just ask you whether
18 there is anything in that patent that teaches the use of
19 acoustic damping material in an acoustic voice tube of
20 a headset.

21 A Yes. Olney was quite specific. I forget just
22 where it was, but he certainly was fully aware of damping
23 and the effect that it would have.

24 Q Take a look at Fig. 19, for example.

25 A That is a reflection of the response of the

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microphone with, as he says, ends of the tubes left open and the solid curve is a response of the microphone with the tubes terminated with acoustical resistance. Mr. Olney, if I may skip ahead, also published a paper that is further on in this exhibit.

I happened to open up to that rather than the patent where he has a long explanation of the effect of damping and shows very clearly that what damping does for the response curve of the microphones.

Q There is a question raised about the, I believe it is the ferrule in the socket of the StarSet having been copied in the R70. Do you know whether or not that was in fact copied?

A Yes, I think it is fair to say that that was copied.

Q What about the voice tube assembly in the R70 and the R71, was that copied from the StarSet?

A No. The voice tube that we have is basically a copy with minor modifications of the 61A which we were producing for the Bell System at that time. The Bell System had the transparent plastic tube, it had the slidable portion on the aluminum. It had the ferrule. It had what we call the puff screen on the end. It had the acoustical resistance in the end.

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1 to the first paragraph and ask you whether there is any
2 reference there to the use of the stabilizing hooks?

3 A Well, I guess the clearest one is that, and I am
4 quoting, an under-the-ear lobe hook was needed for good
5 stability with all types of units.
6

7 I am sure that the under-the-ear lobe hook is
8 that hook.

9 Q What was meant by all types of units in terms of
10 where the voice tube was located?

11 A I believe that to apply to both an over-the-ear
12 version as well as the under-the-ear version.

13 THE COURT: Let's take our morning break now,
14 gentlemen.

15 (Recess.)

16 nd MB

1 Q Mr. Mol, I hand you a copy of the Hutchings
2
3 118 patent in suit, and I think there has already been
4 some discussion of this and I wonder if you would state
5 in a few words what that shows.

6 A Behind-the-ear headset with an over-the-ear
7 voice tube and under-the-ear receiving tube.

8 Q Where are the transducers located?

9 A In the capsule. I am not sure it shows. Yes,
10 in the last drawing, Fig. 3, it shows clearly that the
11 transmit transducer 31 is in the upper portion of the capsule
12 and the receive transducer 36 is in the lower portion of
13 the capsule.

14 Q I didn't mention we are talking about Defendant's
15 Exhibit I.

16 Let me ask you, what is between the transmit
17 and the receive transducers?

18 A There is a connector for making the electrical
19 connections.

20 Q I handyou a copy of Defendant's Exhibit J,
21 which is the file history of the Hutchings 118 patent with
22 the cited reference attached, and also attached are the
23 references which the party Hutchings or his attorney called
24 to the attention of the Patent Office.

25 MR. BRADLEY: I just mention for the record

that in the copy we were supplied by the Patent Office, three of the prior art references were right in the middle of the rest of the papers in this document and we left them that way and put a tab on it showing the three prior art references.

So that is what the confusion is there.

Q I hand you this document and I would like you to first just mention what is in the references that have tabs on the side. The first is DReher which has been discussed and I would just like to ask you whether in your opinion this headset has any acoustical tubes?

A Yes, it has two acoustical tubes, one for the speech. It is basically labeled 21. The other acoustical tube is the passage in Fig. 1 that goes from the wide portion to exit port 19.

Q Do you have any knowledge as to whether the passage through the ear mold in a headset of this type or in an ear mold that is used for a headset or hearing aid is referred to in the trade as an acoustical tube?

A As far as I know, it is an acoustical tube and I think we have always referred to it as a tube. I think in normal language I wouldn't call it "acoustical tube." I would say "the tube."

Q Do you know whether it is known in the trade

1 gwb-3 Mol-direct

2 as an acoustical tube?

3 A I am absolutely sure that it would be.

4 Q We have had marked as Plaintiff's Exhibit 146
5 a Dreher early model of this headset, or what purports,
6 at least, to be a Dreher early model of this headset.
7 Have you ever run tests on this headset?

8 A Last Tuesday morning I ran tests on this head-
9 set at Roanwell Corporation, basically on the 61A headset
10 test rack.

11 Q Do you know whether it performed properly or
12 operated as a headset or not?

13 A Yes, it did. Of course, it has one transducer,
14 but we tested it as a microphone and measured the output
15 and recorded the output and then we turned around and since
16 it has an ear mold on it and we were in a hurry, it is
17 fairly difficult to measure output as a receiver, but I put
18 it in my ear, put in the normal frequency sweep that the
19 61A has and it worked well as a receiver.

20 Q Is this identical to the way I supplied it to you
21 to test?

22 A No, sir.

End 6A 23

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2 Q What changes were made, if any?

3 A Well, we ran in the door and we found very
4 quickly that the receiver which appeared to be substantially
5 the same as that type was open, it simply didn't have any
6 electrical connection.

7 I don't know whether it was during transportation
8 or what, but it was open.

9 So we quickly went to a Dictaphone unit, because I
10 was interested in proving or disproving the theory that in
11 effect this would not act primarily as a microphone with
12 any kind of degree of sufficiency, and we took a Dictaphone
13 transducer, which is a receiving transducer, and snapped
14 it in place and that is what that is.

15 Q Where is the original transducer?

16 A To the best of my knowledge, it is somewhere
17 in Roanwell. We were in a great hurry and left it on a
18 table and we are making an effort to resurrect that.

19 MR. BRADLEY: Your Honor, I was dismayed to find
20 to find they didn't put it back in the box, so we have
21 people over there looking for it and when we find it we will
22 put it with the other portions of this Plaintiff's Exhibit
23 146.

24 Q What is the black material that seems to be
25 closing off the port that goes into the ear?

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2 A Well, it is called Duct Seal by trade name. It
3 is a putty-like substance that we use quite commonly in
4 the acoustical area.

5 Q Was it on here when I supplied it to you?

6 A No, it was not on here when you supplied it to us.
7 I ran two curves. I ran the microphone with that material
8 off the area, which essentially creates a large cavity,
9 and that was the subject we discussed earlier, and then,
10 in order to see what the effect is of at least partially
11 closing off that cavity, I put on some of that Duct Seal
12 in order to more closely simulate the blockage by the
13 human ear, because as you put this in your ear you are
14 in essence creating a partially closed cavity or closed
15 cavity.

16 Q Did it work either of those ways?

17 A Of course, as a receiver with the Duct Seal on it
18 it wouldn't work as a receiver, but, yes, it worked very
19 well as a microphone even though it is a receiver transducer.

20 Q Would you turn to the next reference, and this
21 is the Larkin Patent in suit, and I think that has been
22 explained enough times. Let's pass that. The next
23 reference cited by the examiner is the Flystad Patent.

24 A Yes.

25 Q Would you state briefly what that shows?

1
2 A A behind-the-ear headset with a voice tube coming
3 underneath the ear and a receiving tube over the ear.

4 Q Would you just look at Figure 4, I guess it is, the
5 back of the capsule, and indicate how the electrical connec-
6 tion is made to the headset?

7 A It is a connector. I think it is even more clear
8 in Figure 8 where it shows the areas where the connections
9 are made.

10 Q Do you know whether or not it is a plug-in
11 connector?

12 A I am sure that it is a plug-in connector.

13 Q Would you look at Fig. 6, the portion I am pointing
14 to, and indicate what type of connection there is between
15 the voice tube and the capsule?

16 A What we call a ball joint connection, which is
17 common to the 61As and the other headsets.

18 Q Would you turn to the next reference, which is the
19 Bryant Patent, and just state very briefly what that shows?

20 A It is an in-the-ear headset with a voice tube
21 similar to all the other models we have discussed.

22 Q Does the voice tube have a fixed length in this
23 headset or is it adjustable?

24 A The voice tube is adjustable. It slides back and
25 forth.

2 Q It is a telescoping voice tube?

3 A It is a telescoping voice tube.

4 Q Is this similar to the 61 or 61A model?

5 A Yes, with only a very minor change. The 61 at a
6 later date, the capsule was reoriented to be basically
7 vertical and that required a small change in the angle of
8 the voice tube itself. That is the voice tube as it comes
9 out of the capsule, I don't know how long it is, maybe half
10 an inch, and then the voice tube is angled. So for all
11 practical purposes, yes, it is identical, but it is not
12 precisely identical.

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Q In other words, originally the voice tube more or less faced front and came directly to the mouth?

A That is correct.

Q But when it was decided to make the capsule vertical and then the voice tube came down and made a little bit of an angle and came around to the mouth?

A Yes. Essentially vertical. The capsule essentially vertical.

Q Did that have the effect of lengthening the voice tube?

A Yes.

Q Was that a major consideration in making that change?

A Well, Western Electric made the change and I don't know what their consideration was but there was no resultant change in design of the speech tube for anything of that sort and we never considered it important at all either.

Q Would you turn, then, to the last reference cited, which is a Kreisel Patent and just state briefly what that shows?

A That appears to be a platform or on-the-ear type of headset with a voice tube very similar to the 61. The receiver is a larger receiver sitting in the cavity. The voice tube is virtually the same as the 61.

Q I won't ask you to discuss all the other references that have been called to the examiner's attention but I would like you to just mention what is in one of the references which is the last reference just before the back cover of this Exhibit J and it is marked by a green tab on the side. This is a Rose Patent, 3,031,537.

Would you state what that discloses, briefly?

A That is behind-the-ear hearing aid with the receiving tube going over the top of the ear and the microphone port at the bottom of the case.

Q Incidentally, in all of these is the microphone tube or port colored green and the receive tube or port colored blue?

A Yes, it is.

Q I'd like to refer to a couple of portions of the file history, Mr. Mol, and particularly behind the second tab, which is marked Preliminary Amendment and page 2 of that document, that Preliminary Amendment.

At lines 4 to 7 it states: "Said curved extension acting as a pivot whereby the weight of the voice tube provides a torque which counteracts the torque introduced by the weight of the housing to balance the headset and securely hold the same on the wearer's ear."

Does the voice tube in the Hutchings'118 patent

1 provide a torque?

2 A Yes, it does.

3 Q Is it a substantial or an appreciable torque?

4 A I would call it a minor torque.

5 Q Is it a torque that serves to balance the
6 headset -- I'm talking about in the forward and backward
7 direction.

8 A Well, yes. It tends to balance the headset.

9 Q Does it balance it?

10 A It does not by any means.

11 Q Would the headset be stable if it did balance it?

12 A No, I think if it were balanced, the headset would
13 become very unstable.

14 Q Would you explain that just briefly?

15 A Well, I guess the best analogy I can think of is
16 the most unstable device is a balance scale that is balanced.
17 Any tug or movement on that scale at one end will cause
18 violent swings one way or the other. The maximum stability
19 that we found on a headset that can be obtained is where
20 there is the maximum torque against the ear which tends to
21 hold it in place.

22 It is the ear that does essentially the stabilizing
23 by and large, and the less, obviously within reason,
24 it is not a black and white proposition, but the more one
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counterbalances that affect, the less stable it is. If I put a pencil over my ear, which is balanced, it isn't going to take very much for the thing to start wobbling.

THE COURT: Suppose you put it so it isn't balanced, it isn't going to stay there at all.

THE WITNESS: Well, if I have a hook and all the weight is against one side, the analogy is putting a weight on one side of the scale, then if I tug up and down on the headset, part of the unbalancing force is the affect of the movement on the cord.

As the person moves -- it is clipped by and large to the shirt -- it causes a little tug and pressure on the headset. The balancing actually is -- the stabilization is better, the less the balance. Although I think we are arguing about peanuts. The torque that the voice tube produces on the headset is minor compared to the torque that the capsule produces.

Q Is whatever torque the voice tube does exhibit favorable or unfavorable?

A I would say it is unfavorable without any question.

Q Would you turn to page 5, behind the tab marked Petition To Make Special.

This is a further discussion -- this is a

2 discussion of what is in Claim 1 and its patentability over
3 the references and I wonder if you could state whether there
4 is any indication --

5 MR. ARNOLD: I would like to urge a correction.
6 I'm not sure it is correct to characterize it as an argument
7 of patentability over the references but in all event it
8 does address itself --

9 MR. BRADLEY: I withdraw that. It is a discussion
10 of Claim 1, let me just say that. It pertains to --

11 Q I would like you to state whether there is any
12 indication in that discussion -- do you have the place?

13 A I lost it, I'm afraid. Could you redirect me
14 again. I think I -- no, I don't have it. I have trouble
15 with the ribbon coming loose.

16 MR. ARNOLD: Mr. Bradley, we of course are not
17 arguing what is on the paper. If you would like to read the
18 passage to the Court yourself to direct its attention
19 to it that would be entirely satisfactory and might speed up
20 things.

21 MR. BRADLEY: Well, in summary it is submitted
22 that Claim 1 is clearly patentable over the references
23 cited in that it calls for a headset having a housing
24 with a microphone and receiver, with the housing having
25 an upper curved extension adapted to engage the top of
the ear with the voice tube extending from the top of

the housing forwardly to the user's mouth and a flexible tube communicating with the receiver and adapted to be inserted in the ear of the operator.

And I call attention to the fact there is no indication of where the flexible tube to the ear is located, but there is an indication of where the voice tube is located. This is what I intended to bring out with the witness and so we can skip the questions and I would like to turn to --

THE COURT: What is your point with respect to that Mr. Bradley?

MR. BRADLEY: Your Honor, we feel that the claims in this case are generic to either the two tubes over the ear or the one tube over the ear and the other tube at the bottom. The claim does say that the ear tube that comes around the bottom is attached to the bottom part of the casing but it doesn't say that it leaves the bottom part of the casing to go into the ear.

In other words, we feel it can be construed to go through the casing, around the ear and into the ear.

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4 THE COURT: Well, tha t would be an awfully im-
5 practical construction, wouldn't it?
6 MR. BRADLEY: That is what they have-

7 THE COURT: If you are going to have a tube con-
8 necting to the bottom and then wrapping all the way around
9 the outside case behind and over the top of the ear. I
10 can't imagine anybody would ever want to make it that way.
11 Because of the fact you have a length of tube, because of
12 the fact is would interfere more with the eyeglasses and
13 because of the fact that you would deprive yourself of the
14 anchoring advantage that you get from having a tube connect-
15 ing as directly as possible from the bottom of the casing
16 into the ear.

17 MR. BRADLEY: Your Honor, this is what is
18 present in the continuation-in-part patent that the voice
19 tube is attached to the transducer at the very bottom --
20 I am sorry, the ear tube, and goes all the way up through
21 the casing around into the ear.

22 THE COURT: Well, that isn't shown in the drawings
23 in this case, though, is it? Fig. 3 shows the tube coming
24 out of the bottom of the casing. Fig. 1 shows it going
25 around the bottom of the ear and into the auditory canal.

 MR. BRADLEY: Your Honor, I agree completely
 as far as the disclosure of the 118 patent, they disclose

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2 only the ear tube coming out of the casing at the bottom.

3 What I am saying is they filed a parent case
4 and a CIP case and it is our opinion, our view that the
5 claims are generic to both cases.

6 THE COURT: Have they ever said that?

7 MR. BRADLEY: They have said the reverse. This
8 is not terribly significant because I think we have prior
9 art that pertained to either, but I just wanted to bring
10 this point out as being our position.

11 MR. ARNOLD: May it please the Court we, of
12 course, have latched into a moment of argument but if I.
13 might have 30 seconds, the claim recites in the patent in
14 suit, recites that the ear tube comes out of the bottom of
15 the housing, not a transducer located in the bottom of the
16 housing, but comes out of the bottom of the housing, which
17 I think is markedly different from the continuation-in-
18 part patent which comes out of a lowerly located transducer
19 but travels up and around, so this is the basis for our
20 denial of the claim of the patent in suit reading on the
21 continuation-in-part structure.

22 I guess we can address ourselves to that at
23 argument time.

24 MR. BRADLEY: You say it comes out of the
25 bottom of the housing?

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3 MR. ARNOLD: Claim 1, a flexible tube secured
4 to the bottom of the housing and adapted to provide com-
5 munication. The point is secured to the bottom of the
6 housing, the reference is to the housing, not to the
7 transducer.

8 MR. BRADLEY: Secured to but not comes out of
9 it. I want to make that point.

10 MR. ARNOLD: All right, I accept your point.

11 MR. BRADLEY: The following page, your Honor, I
12 will be very brief on this, there is a discussion -- newly
13 added Claim 5 -- calling for the voice tube being provided
14 adjacent to curved extension and more specifically calling
15 for the counterbalancing action of the voice tube for stably
16 holding the headset behind the wearer's ear. No reference
17 at all being made to the location of the ear tube.

18 THE COURT: Let me say this, Mr. Bradley. I
19 don't believe it is really helpful to this witness on the
20 stand to explain to me what the file wrapper means. The
21 file wrapper is in evidence and you can use anything in
22 there for purposes of briefing and I will look at anything
23 you direct my attention to at that time.

24 MR. BRADLEY: Thank you.

25 Q I would like to just quickly go through the

1 zb-4 Mol-direct

2 book of prior art references which is Defendant's Exhibit
3 K1. The first of these is the Flygstad patent, which
4 you have already discussed.

5 A Yes.

6 Q Behind Tab 2 there are two photographs which
7 indicate that they relate to a Model MS43, which has been
8 discussed as one of the plaintiff's early models and would
9 you just state briefly what those two photographs show?

10 A Behind the ear headset with a voice tube coming
11 underneath the ear and a receiving tube over the ear.

12 Q Mr. Clark has just called my attention to the
13 fact that the cordset on Plaintiff's Exhibit 146 is
14 also new. Do you know whether that is a fact?

15 A As I recall, yes, it is.

16 Q Would you pass about three or four pages back and
17 look at a flyer there which is on the Audiotone Model 77.

18 A I lost the direction. Three or four pages back--

19 Q From the photographs you were discussing. I
20 am sorry. And I at the same time hand to you a model
21 of the Audiotone Model 77 hearing aid which has been marked
22 Defendant's Exhibit K2 and would you just state very briefly
23 where the ear tube is on that headset and where the micro-
24 phone and microphone port are?

25 A The ear tube, the receiving tube is at the

1 zb-5 Mol-direct

2 upper end of the capsule intended to go over the ear.

3 And the microphone port or tube is at the
4 bottom end of the capsule.

5 Q Is that in the back of the capsule?

6 A In the back of the capsule.

7 Q To what would be required to rewire this hearing
8 aid to form a headset?

9 A I think it is basically breaking the connection
10 between the microphone and the receiver and bringing the
11 two connections out separately.

12 Q So the microphone then transmits out?

13 A Out.

14 Q And the receive information comes from external
15 the unit?

16 A That's correct.

17 Q What would be required to convert this to a
18 headset in terms of the addition of a voice tube?

19 A I think basically the electrical conversion
20 we talked about plus just the addition of a tube, in all
21 likelihood containing acoustical resistance.

22 Q Where would the tube then be located?

23 A The tube would be located in all likelihood at
24 the bottom of the ear.

25 Q Would you turn to the next reference behind

1
2 Tab 3 and just state briefly what that shows?

3 A That is a behind the ear hearing aid with the
4 receiving tube or hook coming over the ear and the microphone
5 port or tube at the side of the case at the bottom portion
6 of the capsule.

7 Q They are again colored blue and green, respect-
8 ively?

9 A The receiver is colored blue. The microphone
10 green.

11 Q The microphone port?

12 A The microphone port.

13 MR. BRADLEY: We have, your Honor, immediately
14 behind that patent some excerpts from another document which
15 is part of what we had discussed the other day, answers to
16 interrogatories from Telex vs. PPI which we can discuss and
17 I won't bother asking the witness about that.

18 Q Would you turn to Tab 4. This also has been
19 discussed before. It is the Guttner patent.

20 A Yes.

21 Q Just state briefly what that shows.

22 A Behind the ear hearing aid with a receiving
23 tube coming or intended to come over the ear and the micro-
24 phone tube over the ear.

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2 Q Would you turn to Tab 5 and indicate what that
3 discloses?

4 A Behind-the-ear hearing aid with a receiving
5 tube over the ear and a microphone tube over the ear.

6 Q Would you refer to the translation which is
7 immediately behind this document, the document being
8 a German "das" Number 1,139,549, and please turn to Page 3
9 of the translation, the second full paragraph, and please
10 just explain what is stated in that paragraph.

11 A The second paragraph?

12 Q The second full paragraph on Page 3, yes, colored
13 yellow.

14 A Starting "Once it has been established"?

15 Q Yes.

16 A "Once it has been established that certain di-
17 mensions of the tube line between microphone and sound inlet
18 opening which had originally been planned for spatial
19 reasons are acoustically favorable, the position of this
20 tube line is no longer a decisive factor."

21 Q I am mainly interested in the next sentence.

22 A "The line can, according to a feature of the
23 invention, extend either entirely in the interior of the
24 housing or at least partially on the outside of the housing."

25 Q Would you turn to the next reference behind

1 gwb-2 Mol-direct

2 Tab 6 and state what that shows?

3 A That shows a behind-the-ear hearing aid with
4 both a receiving tube over the ear and a very pronounced
5 microphone tube over the ear.

6 Q This is what we have referred to as the Oticon
7 hearing aid, is that what is indicated there?

8 A That is correct.

9 Q Would you turn to the reference behind Tab 7 and
10 explain what is shown in Figs. 1 and 2 of that reference
11 briefly?

12 A A behind-the-ear hearing aid with the receiving
13 tube on the bottom and the microphone tube at the top of the
14 ear.

15 Q Do you know why the microphone tube is positioned
16 and located where it is indicated in drawings in Figs. 1 and
17 2?

18 A The manufacturer of this hearing aid felt that
19 the positioning of the microphone tube in front of the ear
20 was a better location acoustically than behind the ear.

21 Q Would you mention briefly what is shown in Figs.
22 3 to 6?

23 A Figs. 3 to 6 again has a receiving tube over
24 the ear -- I beg your pardon -- a microphone tube over the
25 ear and a receiving tube, but it is a dual tube as shown

1 gwb-3

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2 in Fig. 4.

3 In other words, both of the lines are in parallel
4 so that both the eucative and the microphone tubes are coming
5 over the ear.

6 Q So in Fig. 1 it intentionally splits and in Fig.
7 if they both come over the ear, is that correct?

8 A Yes, that is correct.

9 Q And behind Tab 8, one of the references the
10 Examiner cited, which I think you said has a telescoping type
11 of speech tube, is that correct?

12 A That's correct.

13 Q Mr. Mol, on the basis of your experience in this
14 field, if one had the knowledge that the Audiotone model 77
15 hearing aid with the ear tube at the top and the voice tube
16 and voice port at the bottom -- and I should call it a micro-
17 phone port -- had been rewired and converted to a headset,
18 would it have been clear to him in 1968 that the hearing aid
19 of different configurations, such as the two tubes over the
20 other behind Tabs 4 and 5 and 6 or the microphone tube at
21 the bottom and the ear tube at the top, could similarly be
22 converted to headsets by making the same rewiring and
23 extending a voice tube from their microphone port or micro-
24 phone tube?

25 A I am reluctant to use the word "obvious," but

gwb-4

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I think if there is ever a use for the word "obvious" this is.

Q There is one other thing I neglected to ask you with regard to the Flygstad patent behind Tab 1, and I think this has been discussed before. I don't want to belabor it, but it is a question of the torque provided by the voice tube.

Does this provide a torque that would be in a direction to counteract the torque of the housing?

A Yes.

Q Would this torque again be appreciable or would it be insignificant?

A Depending on the construction of the voice tube, I think in either case it would be insignificant. By "construction" I mean material, if I may clarify that.

Q You are assuming it is not going to be a lead pipe --

A If it is solid lead, it would be significant.

Q But assuming the voice tubes of the types we have been discussing in connection with this tube --

A It is totally insignificant.

Q I refer you to Defendant's Exhibit VV, which is the British Ministry report that we discussed with Mr. Hutchings, and particularly the suggestion that appears in

gwb-5

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Paragraph 5.7. Would you look at that and state what you understand that to mean?

A May I read it?

Q Yes.

A "The possibility of making a self-supporting capsule and microphone tube to hook over the ear is worthy of consideration."

I think it clearly describes a capsule that is supported by the ear and in this case, more specifically, says that the microphone tube would hook over the ear.

Q Do you find that language to be completely clear or is it ambiguous to some extent?

A To me it is clear. The only lack of clarity is whether the writer intended both the microphone and receiver tube to go over the ear or only the microphone tube. He simply does not talk about the receiver tube. But there is no doubt that he is suggesting the possibility of supporting the capsule on the ear and have the microphone tube hook over the ear which then I think by deduction would say that the capsule would be behind the ear.

Q I hand you a copy of Defendant's Exhibits W1 and W2. One of these, W1, is a letter from Mr. Graham to Barney Langford of Audiotone, the letter being dated March 27, 1962, and the other is a memo, an internal memo, at Audiotone

that is dated March 15, 1962.

I would like to refer you to the memo, first of all, and to the bottom paragraph on Page 2. He states there:

"After discussion with Court and Keith, I am of the opinion that the best way to design a behind-the-ear job is to bring the tube out the bottom instead of over the top. If you will study facial structures, I am sure you will agree that this is about the shortest route and simplifies the problem of separating input and output. In addition, this will give a better balanced device which I feel will hang well on the wearer's ear. It will also simplify the problem of the user's glasses."

What does this have reference to when it speaks about simplifying the problem of separating input and output?

A I would assume this to mean, without very much doubt, the problem that is common in hearing aids as well as headsets of having acoustic coupling between the receiver and the microphone, and it is, I think, a well-known art both in hearing aids and headsets that the further one can separate the input and output, the easier the job of preventing cross-coupling. There are other techniques which can be used in conjunction to further reduce it, such as vibration isolation, but the first step an acoustic designer would

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2 Q Where would you understand the ear tube to be
3 located in the configuration that he is referring to here?

4 A Well, he is clearly stating that he feels that the
5 tube coming out the bottom is the best way, and he is then
6 saying he would like to separate the input and output, which
7 to me would mean that he would go the opposite direction
8 the output as he would the input.

9 So it would make the output tube or the receiving
10 tube over the ear and the input tube under the ear.

11 MR. ARNOLD: Counsel, is it not agreed that this
12 letter was one written in in context of the
13 MS-43 project and that the reference must be back to that
14 basic structure of the MS-43? This letter is a 1962 letter.
15 That was the time the MS-43 came on the market. Maybe I am
16 mistaken. I will leave it for further development.

17 THE COURT: It is a behind-the-ear job. Was the
18 MS-43 a behind-the-ear?

19 MR. ARNOLD: Yes, with the tube out of the bottom
20 that Plantronics offered and publicly used, as the expression
21 goes, for a short while but never sold a unit of.

22 This letter was in context, at least in point
23 of time if not subject matter, with the effort to develop the
24 MS-43 under-the-ear input model which never got off the
25 ground.

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2 MR. BRADLEY: Counsel, to answer your question, I
3 understand that the March 15, 1962 date was the date that
4 they actually had an agreement between Plantronics and
5 Audiotone to go forward with this project.

6 MR. ARNOLD: That was my understanding.

7 MR. BRADLEY: This would be right at the commence-
8 ment of that project. What I am saying here is that he
9 is considering whether the voice tube should go at the top or
10 the bottom.

11 MR. ARNOLD: Surely.

12 MR. BRADLEY: The question is in what context.
13 I think the witness has said with the ear tube over the top.

14 In other words, they are comparing either having
15 two tubes over the top or having the ear tube over the
16 top and the voice tube at the bottom.

17 Q Is that correct, Mr. Mol?

18 A That is correct, but I might add one comment and
19 it pertains to what the Court had suggested before.

20 There is a method of separating input and output if
21 one chose to go over the ear with both, and that would
22 be to take one of the tubes literally outside of the housing.
23 I think it is somewhat unlikely but that is about the
24 only other furthest interpretation I could make.

25 Q When he says in the last sentence on page 2 that,

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2 "This construction of bringing the voice tube out of the
3 bottom will also simplify the problem of the user's glasses,
4 is that also consistent or is it inconsistent with your
5 statement that this pertains to a comparison between two
6 tubes at the top or one at the top and one at the bottom?

7 A There is no doubt in my mind if the problem of the
8 user's glasses was in mind, as he evidences here, that he
9 would not go through the extra effort of putting both input
10 and output tubes over the ear. It is not consistent
11 with his awareness of the problem of user's glasses.

12 Q I hand you a copy of Defendant's Exhibit W-3,
13 which is undated but which presumably came from the
14 Audiotone's file, if I am correct.

15 MR. JANICKE: Yes, it came from a group of papers
16 in the Telex versus Plantronics suit and the group of papers
17 was indicated, although we never traced it all the way
18 back, to have come from Audiotone's files on that project.

19 MR. ARNOLD: It is hearsay to us as to where the
20 paper came from and we certainly do not want to represent
21 to anybody where it came from.

22 MR. BRADLEY: That is the best information I have
23 on it.

24 MR. ARNOLD: Other than it came from the Telex
25 litigation file.

1 Q Would you indicate here what this rough sketch
2
3 shows in the middle of the page?

4 MR. ARNOLD: May it please the Court, I don't
5 understand an authentication of this document for any
6 purpose material to this lawsuit and what it shows I think
7 is therefore immaterial as to this lawsuit. We know
8 only it came from the files of another lawsuit.

9 THE COURT: It isn't dated, even.

10 MR. BRADLEY: It is my understanding we stipulated
11 all of these ones you have produced with your EP number on
12 it are agreed to be authenticated.

13 MR. JANICKE: The stipulation is that documents
14 originating at Plantronics or received by Plantronics
15 in the course of its business are authentic, and I will say
16 this is authentic, the copy you have, to the extent that
17 it is the document found in the Telex litigation files
18 which you asked to inspect in your first round of document
19 requests.

20 Beyond that authenticity I just don't know.
21 It is that authentic and I don't know anything further.

22 MR. ARNOLD: I find myself in another embarrassment
23 that we have also admitted to the receipt of the exhibit in
24 evidence, your Honor, and I don't want to be in a position
25 of backing away. Let the witness testify about it.

1 THE COURT: I don't know what good his testimony
2 will do since we don't know, even after he gets through,
3 who drew it or when. So what good does it do to establish
4 what it shows?
5

6 MR. BRADLEY: Your Honor, I think that I would be
7 inclined to just skip it.

8 THE COURT: All right. I am so inclined, too.

9 Q Considering this last paragraph on page 2 of W-2,
10 would you concur with the feeling that was then reached
11 that it would seem like the better construction once the
12 hearing tube was established at the top, that it was
13 a better construction to bring the voice tube out the bottom
14 than to also put the voice tube at the top?

15 A I think I would agree with that.

16 Q And turning to Exhibit W-1, which we discussed
17 just a few minutes ago, and the second paragraph thereof
18 where Mr. Graham states that he has tried several tube
19 configurations and he refers to the top and the bottom and
20 then at the end of the sentence he states that, "In
21 order to solve the balance problem the tube must be very, very
22 light at its outerextremity," do you agree with that?

23 A "Very, very," is a kind of indefinite qualifier,
24 but yes, it must be light, in particular at the outward
25 extremity. I would agree with that.

Q I hand you a copy of the Hutchings design patent that is involved in this suit which is Defendant's Exhibit P, and also a copy of the file history and references which is Defendant's Exhibit Q, and I think we can all see what the configuration of these things are, there is no need to explain what is in that patent, but I wonder if you would just briefly look through the cited references in Defendant's Exhibit Q and just state in a very few words what they show.

The first is an Olsen Patent which is shown on the tab marked Olsen.

A That is a headband-supported microphone structure, as near as I can tell.

Q Would you look at the next reference and state what that shows? That is a Hothem Patent.

A That is again a headband supported microphone structure, no earphone that I can tell.

Q Would you then state what is in the Mullin Patent?

A That shows a behind-the-ear hearing aid which apparently, as an option, can be headband mounted and has the receiver tube coming over the ear.

THE COURT: It seems to me that is the only one that has any apparent relevance to the design of the Hutchings Patent, Exhibit P. I can't see any relevance at all with

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respect to the other two references, Olsen and Hothem.

MR. BRADLEY: I am inclined to agree, your Honor.

2 Q I would like you to look at the defendant's R-70
3 headset and I refer you to the sample which is marked
4 Defendant's Exhibit L-3 and would like you to compare that
5 in weight and size and general configuration with either
6 the item shown in the plaintiff's patent marked Exhibit P,
7 or with the StarSet itself, which is marked Defendant's
8 Exhibit U, and I'd also like you in making the comparison
9 to make reference to an outline drawing which we have
10 prepared, which is Defendant's Exhibit WW and, of course,
11 which doesn't show anything in terms of perspective but
12 simply the outline.

13 Could you make that comparison, please.

14 A Well, I think the obvious difference when one
15 holds the capsules is for one, the difference in the size
16 and in particular with regard to the width. I think the
17 whole area of the connector --

18 Q Could you hold them up so --

19 A Okay. This upper portion --

20 Q Maybe the Court could see the part you are
21 referring to.

22 A I am talking about this particular portion, your
23 Honor, versus this. I think they are substantially different.
24 Also this bottom portion which you can see is substantially
25 different.

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Q That's it below the connector?

A Below the connector.

Q The first part you meant was the corner above the connector?

A The corner above the connector. I think the cross sectional shape looking from the top is different.

Q Why is the cross sectional shape different?

A Because we have thicker capsules and I think this is strictly a functional consideration, what the thickness of it is.

Q Please proceed.

A There is in addition to that the under-the-ear hook which certainly makes a difference. The similarities by and large -- there are similarities. I think the similarity by and large is the diameter size of the cord, which is the same as the 61A.

The speech tube and its method of sliding in and out, which is essentially the same as the 61A. The movable socket which is the same as the 61A. The ear tubes which are standard hearing aid ear tubes.

I think the additional similarity is the over-the-ear hook and the little ferrule. So there are substantial differences and there are substantial similarities.

Q The bottom toes are similar, that go into the

2 hearing portion?

3 A In terms of the shape and the general angle? Yes,
4 they are substantially the same.

5 Q How about the portion that forms a curve that
6 follows the outside of the ear?

7 A Yes, I think there are similarities. There
8 may be a difference because we, with the fatter capsule,
9 had to adapt to the ear a little bit different but by and
10 large when one holds it up, I think the two curves are the
11 same and they are probably both identical to a multitude
12 of hearing aids.

13 I think if you give ten manufacturers the job
14 of coming up with a shape behind the ear they will
15 probably come up with an almost identical shape.

16 Q Would you explain what this drawing shows and I
17 mention for the record that the drawing was made with the
18 two internal curves about the ear laid together as closely
19 as we could do.

20 A Well, it shows --

21 Q That is Exhibit WW.

22 A I think the word is plan view. In other words,
23 one dimension. Which is probably the most similar between
24 the two sets of any view. With the two curvatures coincident
25 and yet I think one sees that the, certainly the shape

2 of the capsule and its position on the ear is substantially
3 different to me than the other one.

4 Q Mr. Mol, I'd like to hand you the prior art
5 book that we have on the design patent, which is Defendant's
6 Exhibit R-1 and again I mention that we are mainly
7 concerned with appearance, so we can discuss these very
8 quic

9 Before you start on these I'd like to ask you
10 was there any patent cited that showed the overall con-
11 figuration of a behind-the-ear capsule with a voice tube or
12 let's say an elongated tube projecting forward and another
13 tube wrapping around into the ear in the three sided
14 references?

15 A I think I lost you. I must not have been paying
16 attention.

17 Q Well, let me withdraw the question. I think maybe
18 we can observe that in our brief on the basis of what
19 is shown there. Judge, don't you --

20 THE COURT: I thought he said there was one
21 behind-the-ear capsule and that was Mullin that was cited.

22 Q Let me refer you back to Mullin. What I was asking
23 you was, was there any cited references that showed both
24 the behind-the-ear capsule and both the voice tube projecting
25 up to the mouth and an ear tube going into the ear?

A No, not anywhere close to that. I think the

only one it shows is the behind-the-ear capsule.

Q That's the Mullin Patent?

A That's the Mullin Patent.

Q Would you look at the prior art book, Defendant's Exhibit R-1, and the first reference behind Tab 1 is Flygstad. We can all see what that shows and you have mentioned it. The behind-the -- behind the second tab is the Oticon hearing aid and the only relevance we feel that has is, any relevance it might have to the internal curve and I believe Mr. Hutchings has testified about that so would you start at Tab 3 and just state briefly what they show in terms of shape.

A Tab 3 is a behind-the-ear hearing aid, with, I assume, a receiver tube over the ear.

Q And we can see the capsule shape there.

A Yes, very clearly.

Q I think we are interested in whether any of these are squared off in any part or rounded.

A I think on the Weiss Patent, about the only squaring off is somewhat at the top but it is largely functional. It is the shortest way to get from the tube to the edge of the transducer.

Q Are you talking about the very top surface?

A Yes, that's what I'm talking about. In fact

it is not toally flat as it appears.

THE COURT: He is talking about that knee out at the upper left-hand corner as viewed in Figure 1.

Q How about the portion from that knee down to the round circle 32?

A That is basically flat.

Q Then the remainder of the back seems to be curved?

A That is correct.

Q In the bottom we can see what the shape of that is and No. 4 is -- behind Tab No. 4 is Selectronic 1, which at least to me seems to be very similar to the Mullin Patent that was cited, does it not?

A Yes. I think so. It actually has a little bit more squaring off effect I think at the top and at the bottom. But it is substantially the same as the Mullin Patent, that that shows what appears to me a square top and a square bottom a flat top and a flat bottom.

Q And turning to Tab 5, unfortunately we couldn't get a very good copy of what is shown here. These are Qualitone hearing aids and perhaps you can just mention what is shown on the first of the two ads that are behind Tab 5?

A The first of the two ads, up in the upper left-hand corner near the key, again, I think it shows a

1 behind-the-ear hearing aid, rounded portion behind the ear,
2 fairly flat surfaces both top and bottom and what appears
3 to be sort of a curved surface may be made out of two or
4 three straight lines in the back but I'm afraid that the
5 picture isn't really clear enough to be able to discern that
6 accurately.
7

8 Q In the last --

9 A In the next page -- this is the same unit -- in
10 the next page, I think it shows the square or flat top and
11 bottom and it definitely shows the rear curved portion to
12 be substantially at least almost halve to be made out of a
13 straight line.

14 Q What back portion?

15 A The portion -- not the portion touching the
16 wearer's ear but the one, once it is mounted on his head
17 would be the furthest portion back of the hearing aid.

18 Q You mean that entire back?

19 A No, the upper portion of that back.

20 Q The entire back didn't look flat to me.

21 Behind Tab 6, would you state what that shows?

22 A Well, again a behind-the-ear hearing aid with
23 substantially flat tops and bottom or top and bottom
24 and a curved back surface.

25 Q How about what I have called the nose in the bottom

2 right-most portion?

3 A That is actually a square, almost a 90 degree
4 angle.

5 Q This is a Vanco hearing aid and we have secured a
6 sample case of the Vanco hearing aid, which is Exhibit R-2,
7 and I wonder if you could hold that up next -- it is
8 a little bit obscured by this marking tag on it. I will
9 remove the exhibit number for a moment.

10 Could you hold that up next to the Plantronics
11 StarSet, put the two ear curves together and just show how
12 they compare and how they differ?

13 A The ear curves, you mean the inside portion?

14 Q Yes, I think just align that and just hold it up
15 so it can be seen as to what extent they are similar and
16 what extent they are not.

17 A I think within very few thousandths, they are
18 identical.

19 Q You are referring to the top edge?

20 A I'm talking about the totally inside curved portion.
21 The top edge also tends to be the same angle and
22 also flat, as the hearing aid. The back portion, although
23 it is flat, is slightly different angle than the Plantronics.

24 THE COURT: What are you comparing there now
25 with the Plantronics?

MR. BRADLEY: The Vanco hearing aid case.

THE COURT: That's the same thing as shown here?

MR. BRADLEY: Yes, your Honor.

THE COURT: All right.

Q I take it from your testimony that you don't find any of these prior art references to have the identical shape that the Plantronics StarSet has?

A Certainly not identical.

Q How would you characterize these differences as between -- in comparison with the differences between the StarSet and the Roanwell R-70?

A In the cited references? The cited references don't look at all I think by and large as the StarSet.

Q Well, I was asking you rather a vague question but I would like to have just your general feeling. There are differences, you have indicated, between the StarSet on one hand, and the defendant's R-70, on the other hand. Is that right?

A That is correct.

Q And there are differences between the StarSet on one hand, and the prior art references we have discussed on the other hand? Is that correct?

A Yes.

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Q How would you characterize these differences between the StarSet and the prior art on the one hand and between the StarSet and the Roanwell R-70 on the other hand?

THE COURT: In other words, which differences are greater?

A I am not clear what you mean by prior art, counsel. Do you mean the book you have shown me here?

2 Q Yes. The book and the Vanco hearing aid case.

3 A Okay. I think there is as much similarity
4 between all of those and the StarSet as there is between the
5 71 -- the 70 and the StarSet.

6 Q I show you a copy of Defendant's Exhibit HH,
7 which was the first working model made by Mr. Hutchings,
8 according to his testimony, and which is said to still
9 have a rounded curve, and I ask you whether in your opinion
10 the Roanwell R70 is closer to the hearing aid shown in Exhibit
11 HH, which also appears in Plaintiff's exhibit, in the actual
12 model, as Plaintiff's Exhibit 103, and let me start the whole
13 question over.

14 These comparisons get to be long questions.

15 Let me put these three side by side. One is the
16 R70, one is Plaintiff's Exhibit 103, and one is the StarSet.
17 I don't mean to range them in any particular order for any
18 significance.

19 Let me ask you whether you feel the Roanwell
20 R70 is closer to Plaintiff's Exhibit 103 or to the StarSet?

21 A There are so many differences between all of them,
22 it is very hard to come up with an evaluation. I think there
23 is a substantial difference between 103 and the StarSet.
24 There are substantial differences between the Roanwell and
25 the StarSet.

1 zb-2
2 Mol-direct
3 821
4 I would say that there is -- I think the differ-
5 ences are -- I don't think I can definitely say one is more
6 different than the other. I think they are three separate
7 ones, almost like a triangle.

8 Q I would like you to just briefly look at Defend-
9 ant's Exhibit DD, which shows the progress of the development
10 of Mr. Hutchings' on the unit that had the voice tube over
11 the ear and the ear tube under the ear, and I wonder if you
12 could just move from drawing to drawing and indicate the
13 type of considerations that are involved from a technical
14 standpoint in making the design and progressing with the
15 design.

16 I am not suggesting you state what was in Mr.
17 Hutchings' mind, but just what you understand from your exper-
18 ience with headsets.

19 A Well, I think --

20 Q Maybe you can use the page numbers so the record
21 will reflect what you are saying.

22 A I think Page 1 is an initial layout, fairly
23 straightforward. Putting in the microphone and receiver
24 sizes. The solid model on Page 2 is by and large, I think,
25 a reflection of the previous layout, although with a differ-
 ent intent, and, consequently outside dimensions.

I think Page 3 --

1 Q Would you hold up a minute.

2 A I am sorry.

3 MR. BRADLEY: Plaintiff's counsel has misplaced
4 their copy.

5 THE COURT: You are looking at DD now?

6 MR. BRADLEY: We are looking at DD, your Honor,
7 and the witness -- would you just repeat again what you see
8 on Fig. 1.

9 A Fig. 1 looks like a very rough layout as one
10 would when you know the size of the transducers to be put
11 in and the approximate location.

12 Q Is there any significance in the angles of the
13 transducers there or the squareness of the shape?

14 A The significance, I guess, is the two transducers
15 have ports that kind of establish the orientation. The square-
16 ness and the walls, I think, by and large are the shortest
17 distance between two points which are required to envelop
18 the transducers.

19 I think the Page No. 2 is just an outside dimen-
20 sioning for solid model purposes, as it says down below
21 in the title block. It is a fairly good reflection of Page
22 No. 1. It may be identical. I don't know.

23 Page No. 3 has taken the outside model in the
24 previous page 2 and extended the area where the voice tube
25

1 zb-4

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2 is to be attached so it is just a straight extrapolation.
3 It lengthens the portion to connect to.

4 Page 4 appears to be a somewhat smaller scale
5 layout, I would guess, I haven't measured it, but it has
6 particular emphasis on a contemplated connector. It may
7 have moved the transducers slightly, but substantially the
8 h is still the same shape.

9 Page 5 is merely a detail of what the shape that
10 contacts the ear should be as we previously discussed.

11 Page 6 appears to be kind of a combination of
12 having the connector as well as what appears to be the
13 initial concept on some sort of a bayonet connection for the
14 voice tube.

15 It still has the two different size transducers
16 and it has a fairly small plug. The other view sort of
17 shows the thickness required to house the transducer.

18 Page 7 appears to make room for a somewhat larger
19 connector. It would appear to me that there was an attempt
20 to push the transducers apart a little bit and make more
21 room for the connector.

22 Page 8 is a much more detailed drawing reflecting
23 all of the things we have discussed before. I think a
24 fairly good connector area location for the receiver with
25 the port out the side, still a small microphone area, and

zb-5

Mol-direct

1 it has pretty well detailed the front microphone tube con-
2 nection area and the ear hook.
3

4 Page 9, the left-hand view appears to be very
5 similar to what we have discussed on Page 8. The difference
6 on the right-hand view largely is the larger transducer that
7 is laid in which then required enlarging the case. It
8 appears from the lines on the left-hand figure that the way
9 that this was done is merely by going in a straight line
10 fashion and then reorienting the transducer, the microphone
11 slightly to fit it in.

12 I think by and large, unless rounding serves a
13 direct purpose, in plastic molding you intend to go in
14 straight lines wherever you can, unless it has a particular
15 utility or appearance. Straight lines are just the way
16 that you would go.

17 Q Can you determine from your experience whether
18 the original layout on Page 1 of Defendant's Exhibit DD and
19 whether the various changes throughout this Exhibit DD up
20 to Page 9 are functional changes and non-functional changes?

21 A I have not detected any change that appears to
22 be non-functional. I think every change that was made
23 was made, to me, for a very logical reason.

24 Q I wasn't referring only to the changes. I was
25 referring to the initial layout of Page 1.

zb-6

Mol-direct

1 A Once one has established a curve of going behind
2 the ear and then giving the two transducer sizes and the
3 desire to separate them as far as possible, and then making
4 an electrical connection through a connector, there isn't
5 an awful lot of choice as to what is left if you want to
6 make it a small capsule.
7

8 So by and large the outside is pretty well
9 established by functional considerations, I would say.

10 THE COURT: Well, if you will turn again to Page 9
11 the right-hand figure there which has the squarish projection
12 to accommodate the larger square transducers.

13 THE WITNESS: Yes, sir.

14 THE COURT: Functionally that could just as well
15 have been designed so that the sides of the transducer,
16 instead of being at an oblique angle to the general axis of the
17 case, were parallel?

18 THE WITNESS: That is true, your Honor. However,
19 what that would cause, in turn, if you tried that, is that
20 this upper portion, and I don't know how else to describe
21 it, the very upper portion, the one that is not quite the
22 straight line at the top, would cause to be higher and one
23 of the desired characteristics of this device is to have
24 a minimum interference with glasses and to reduce that
25 height as much as possible so the orientation of that

zb-7

Mol-direct

transducer is governed . ally by two factors. One is the availability of the location of the port on that transducer, which one would like to have in as reasonably a straight line as possible. Acoustically you don't like to have right angle turns, although sometimes you must. Plus a desire to not have that portion go too high.

I think if I twisted that, as you suggested, I would definitely have the curve which is now slightly sloping down, would definitely be going up.

THE COURT: Yes, and it would be a little higher at that point but it would be lower where the outer corner of the transducer now is, so that you would be highering one point and lowering another.

THE WITNESS: That is correct. But then --

THE COURT: The total volume of the case, I should think, would be a little less with the parallel configuration instead of the oblique configuration, or orientation of the transducers relative to the size of the case.

THE WITNESS: I think another factor, if you twisted the microphone transducer as you suggested at that point, and stayed away from the connector area, it would bring the whole back of the unit further out because the curvature over the ear progressively goes further to the back, so if you take the corner that is now touching that

zb-9

Mol-direct

THE COURT: I think mine probably do.

THE WITNESS: You got it way too low.

THE COURT: Yes, there is interference.

THE WITNESS: By and large, most glasses don't go out that far because they are also intended to hook behind the ear.

THE COURT: I am going to discard that statement because you haven't been qualified as an expert on eye-glasses.

THE WITNESS: That is true.

THE COURT: All right, go ahead.

Off the record.

(Discussion off the record.)

Q Mr. Mol, from your experience in this field, do you view the design that is in the Hutchings patent in terms of the references that we have talked about in hearing aid cases, and in terms of the Flygstad behind the ear headset which are all somewhat different, some squares and some rounds, and so forth, do you view the Flygstad -- the Hutchings design to be within the skill of the ordinary designer or beyond that?

MR. ARNOLD: May I ask whether the witness has been qualified as an industrial designer as distinguished from a technical designer?

App. 1714

1 zb-10

Mol-direct

2 MR. BRADLEY: I asked him on the basis of his
3 experience, but let me see if he has any qualifications
4 in that regard to start with.

5 Q Do you have knowledge of designs that have taken
6 place in headsets in this period of time?

7 THE COURT: Well, that won't help you.

8 What experiences he had as a designer, not him
9 seeing designs.

10 That would make everybody an expert.

11 id 9B

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MR. BRADLEY: I meant overseeing others doing designs, in that sense.

4

5

6

Q What experience have you had yourself in making designs or overseeing designs by people reporting to you or that type of thing?

7

8

A At that period of time, I would assume, or today, sir?

9

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Q Well, either way.

THE COURT: No, he would have had to have been an expert at the time of the design, mustn't he, according to Section 103?

13

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MR. BRADLEY: Your Honor, I think you can assess whatever weight to his statement. In other words, if he is a qualified designer today, he can say in terms of the art at that time what he feels and you can maybe assess a different amount of weight to that than if somebody had been a designer for 10 years. I think it might be admissible but it is probably only a question of the weight.

20

21

22

23

24

25

THE COURT: I won't make objections.

A I would like to very quickly answer in two phases. My experience at Digitran was with thumbwheel input devices, which were human interface requirements. Because they were by and large panel-mounted devices, the appearance of them was very critical as well as the human engineering

App. 1016

1 gwb-2

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2 aspects.

3 In particular, the appearance was very import-
4 ant. As a consequence, we had an outside industrial design
5 company work with us in virtually every bit of design that
6 we did and I, as director of engineering, was the main
7 contact with the industrial design consultants, who did
8 quite a bit of work at Digitran.

9 After my experience in the headset field, which
10 I will deliberately ignore, but I believe I have had some
11 experience. Where I am now, at Pitney Bowes, we have a very
12 sizable industrial design department, in the projects I
13 supervise I have two industril designers assigned to me full
14 time, and they report to me functionally in order to assure
15 that the designs that we crank out from a functional stand-
16 point are acceptable from an esthetic standpoint, and I
17 probably spend a minimum of three or four hours a week dis-
18 cussing with the corporate industrial design department and
19 the corporate industrial design director, the work of those
20 people, the impact it has on the technical design and the
21 compromises and changes I would like to make.

22 Q You omitted your headset activity, and I wish
23 you would fill that in.

24 A In terms of design, obviously we did a lot of
25 work on both the 70 and 71A. We did a lot of appearance

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design and we also dealt with Western Electric in terms of appearance design.

I think it has been previously mentioned that the Henry Dreyfuss organization did work on the 61A, and in relation to the changes that Western Electric was continually making, I was in contact with the Henry Dreyfuss organization regarding the 61A, the color schemes and the required characteristics that they felt a good headset should have.

Q What about the work that you next did? Did you have any responsibility for either approving that or commenting on it, or anything of that nature?

A Well, I think, as any good engineer, you try to keep the esthetic in mind when you design. You try to compromise to the best of your ability.

Certainly I would say Unex did almost no work from an esthetic standpoint without my direct approval, and I think if there is one contradiction that Roanwell and, more specifically, I made was the attempt to have a happy compromise between the functionality of the device as well as the practicality of building it and the appearance.

Q You yourself are not an industrial designer?

A I am not by any means.

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1 gwrf 10 b am 1 Mol-direct

2 Q And you never have been?

3 A I never have been.

4 Q With those limitations I ask you if you would
5 respond to the question I asked before which was
6 whether you consider, in terms of the items I have mentioned,
7 Flygstad on the one hand and various hearing aid
8 casings, whether you consider the Hutchings design to be with
9 in the ordinary skill of a designer or beyond that in 1969?

10 A I think by and large an ordinary designer could
11 come up functionally with substantially what we are
12 discussing. It is very hard to perceive, after a design is
13 made, how much es hetic evaluation has gone into it on the-
14 part of that designer. I am loathe to criticize someone as
15 having done a pure functional job with no esthetic
16 consideration, but I would expect a headset very similar in
17 appearance to the one we are discussing to come out of at
18 least 80 or 90 per cent of the designers, and I am
19 talking about a mechanical designer with sufficient
20 experience to handle this kind of a project.

21 I would expect 80 or 90 per cent of the designers
22 to come out with substantially the same device.

23 Q One last point, Mr. Mol. This is in regard to
24 another matter. There has been discussion of size of
25 holes in voice tubes and I would like you to comment on

1 gwrf 2

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2 two voice tubes. One is plaintiff's early model of the
3 Maico hearing aid which is marked Plaintiff's Exhibit PP-4,
4 which, as we discussed before, is a Maico hearing aid
5 eyeglass set with a voice tube attached. It is the actual
6 physical model.

7 Have you measured the size of the passage through
8 the voice tube?

9 A Yes, I have. In fact, this morning.

10 Q How did you measure it?

11 A We have a set of pin gauges that are quite accurate,
12 and inserted the pin gauge in the tubing.

13 Q What is the size of the opening?

14 A It is roughly an eighth of an inch. A .120
15 pin guage goes in easily, a .128 does not.

16 Q Did you try a .125?

17 A We did not have one, sir.

18 Q On the later model which has been called the
19 Zenith model headset and which is marked Plaintiff's Exhibit
20 PP-5 and which is the one that essentially corresponds in
21 configuration to the model shown in the patent in suit,
22 did you measure the passageway through the voice tube in
23 this headset?

24 A Yes. We have a .086 pin that enters the voice
25 tube for at least an inch and a half to two inches. I

1 gwrf 3 Mol-direct

2 would say the voice tube is .086 in diameter, internal
3 diameter.

4 Q Does it enter the voice tube from both ends?
5 Did you take the voice tube --

6 A No. The pin gauge that I inserted was from this
7 end.

8 Q "This end," doesn't mean anything for the record.

9 A "This end" being the end that attaches to the
10 transducer tube. The other end, the end where the voice
11 would normally enter, has a ferrule which for a very short
12 distance either makes the voice tube larger or contracts.
13 It depends where one measures it. But the tubing diameter,
14 which is what we have been talking about all the time,
15 is .086 diameter.

16 THE COURT: Which one is that?

17 MR. BRADLEY: That's Defendant's Exhibit PP-5,
18 which has been called the Zenith type headset. It is
19 just called the Zenith type because they use Zenith trans-
20 ducers in it.

21 Q Mr. Mol, do you have any financial interest in
22 this suit?

23 A None whatsoever.

24 MR. BRADLEY: I have no further questions.

25 THE COURT: We will take our noon break now. I

1 gwrf 4

Mol-direct

2 want to call my chambers first and see when those con-
3 ferences are set up. It may be more logical to get them out
4 of the way and then come back if they are going to be over
5 3:30 or so. That would make more sense.

6 MR. BRADLEY: Could I now put on the record we
7 have now recovered the original part from that
8 Dreher original model of headset and I will simply put them
9 in the box with the remainder of Plaintiff's Exhibit 146.

10 THE COURT: All right.

11 The trouble is the conferences I had scheduled
12 for this morning were put on this afternoon. So I
13 had eight conferences starting at 2:00 and the last one
14 schedule for 4:00, but quite probably we wouldn't finish
15 eight between 2:00 and 4:00 o'clock or 4:30. If you want
16 to come back at 4:45, then we will try to get you in then.

17 MR. ARNOLD: Very good, your Honor.

18 (Luncheon recess.)
19
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MR. BRADLEY: Your Honor, our case is essentially closed. We had one exhibit, which is DDD, a single page flyer, of Knowles, that the plaintiff has no objection to.

MR. JANICKE: Right.

(Defendant's Exhibit DDD was received in evidence.)

H A N S C O R N E L I U S M O L resumed.

CROSS-EXAMINATION

BY MR. ARNOLD:

Q Mr. Mol, your deposition was taken in this case October 1972, and at that time you still felt very strongly, did you not, that the Western Electric Model 61 had a full life and future in front of it?

A Yes, I did.

Q And that testimony was given on this sales curve at about the end of the third quarter, that being October, '72, which probably means that you had some knowledge probably of sales data that was going back maybe a quarter before that until about this place on the sales curve, is that about correct?

A Well, I had no accurate knowledge of sales data. The sales as we had it on the 61 came in rather large lump

1 sum quantities of orders. I would not be able to extrap-
2 olate the trend.
3

4 Q Fair enough. You have indicated that in all
5 events, whether your sales data were detailed and accurate
6 at that time as of the time of your deposition, the real
7 impact of the StarSet as a total replacement of the 61 was not
8 yet clear or obvious to you, isn't that correct?

9 A I realized it had a large impact. I wasn't
10 able to predict that this impact would remain.

11 Q You have indicated that during the early days of
12 the work during the summer of '69, at Roanwell, relating
13 to the development of what has become the R70 and R71, that you
14 visualized the over-the-ear input idea and you sketched it
15 on envelopes or the like. Did you testify to that effect?

16 A No, I don't believe I did, sir.

17 Q Correct me on that.

18 A I don't specifically remember any over-under ear
19 ideas. I said the back of the envelope sketches dealt
20 with capsule size and shape rather than orientation one way
21 or the other.

22 Q I wanted to get that straight because we hadn't
23 found a single drawing during that period until we got to
24 the second Unex report. Maybe that means we ought to go
25 immediately to the second Unex report, because I thought

1 gwb-3

Mol-cross

2 there was a mistaken implication there.

3 When you testified with respect to Defendant's
4 Exhibit O-1, which is Sketch No. 19 from the second Unex
5 report, you testified to the effect that you had no informa-
6 tion that Unex at that time had any information from any
7 outside source about an over-the-ear input tube, did you
8 so testify or did you not?

9 A I believe that is accurate, yes.

10 Q The reason that I challenge that is that on the
11 letter of transmittal from Unex to --

12 MR. BRADLEY: Counsel, I think the testimony
13 pertains to two tubes over the ear.

14 MR. ARNOLD: Maybe I am being confused.

15 Q The exhibit O-1 shows two tubes over the ear and
16 your point was that they had no outside information at that
17 time of two tubes over the ear, is that your point?

18 A My answer was I did not know if they had out-
19 side information. I had no knowledge of them knowing of
20 outside information.

21 Q At least you know on Page 74 of Plaintiff's
22 Exhibit 140, a copy of which I show you, which is a letter
23 of transmittal from Unex to Roanwell, that included that
24 drawing, there is the recitation in the second paragraph,
25 which reads:

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Mol-cross

1 gwb-4
2 Mol-cross
3 "In response to your initial reaction to our
4 first report, I did additional general design and sketches
5 on the possibilities of an over-the-ear voice tube as
6 suggested by your sales department."

7 So we do know that your sales department had
8 by that time made the suggestion to Unex about going over the
9 ear?

10 A May I correct that? The sales department had
11 not made the suggestion to Unex. The sales department
12 had made the suggestion to me and I transmitted that to
13 Unex, sir.

End 1A

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2 Q All right. So if there was earlier testimony
3 that you didn't know about Unex having any over-the-ear
4 outside information as of the time of Exhibit O-1, that
5 should be qualified by the circumstance that they had
6 received the information reflected on page 74 of Exhibit 140?

7 A Well, sir, I think the question was asked in con-
8 text whether they had outside information. I felt that
9 with "outside" you meant non-Roanwell-Unex information.

10 Q Fair enough.

11 A And more specifically in regard to, say, a
12 hearing aid of a given nature.

13 Q All right. That clarifies that point, then, so
14 we don't have the difficulty that I thought we had with it.

15 Who was the very last person that you can identify
16 by name that suggested to you that there would be a sub-
17 stantial attenuation, something substantially more than one
18 db, anything substantial, resulting from extending the voice
19 tube from shorter positions like so to longer positions
20 like so? Who is the last person you ever heard say
21 that would be a substantial difference in attenuation?

22 A To my knowledge, no one ever discussed with me
23 any degree of attenuation that was expected as a result of
24 lengthening or shortening a voice tube. I experienced the
25 change in the voice tube when we basically did our detail

1 design on the 70 and 71, but maybe it was because of a
2 lack of knowledge on my part, but we never had any
3 serious discussions of any problem occurring due to the
4 length of the voice tube and I certainly did not raise
5 the question.
6

7 THE COURT: For the record, what is the change
8 in length between the short and long positions of
9 the voice tube?

10 MR. ARNOLD: It would appear to be a potential
11 1-5/8.

12 Is that a fair one?

13 (Counsel confer.)

14 THE WITNESS: I think that might be somewhat differ-
15 ent on our unit.

16 MR. ARNOLD: 1-3/4. I believe we can stipulate
17 it is essentially 1-3/4 on the StarSet.

18 THE COURT: What degree of attenuation would
19 you expect from increasing the length of the voice tube by
20 1-3/4?

21 THE WITNESS: Well, sir, to be completely candid,
22 I don't think I knew enough to expect or have thought
23 about the amount of attenuation that I would expect. I
24 was aware verbally, being told by the acoustics people
25 that worked for me, that the damping had a far greater

1 affect on the shape of the curve than any other item,
2 and I don't recall ever discussing with anyone the attenuation
3 that would result of the tube. This is either an oversight
4 on the part of all the people I dealt with or on my part, but
5 it simply was not a consideration in the design. We knew
6 that lengthening or shortening the voice tube might
7 change the shape of the frequency curve slightly and
8 that that changing of the shape might be reduced by proper
9 application of acoustic resistance, but beyond that I don't
10 remember any discussions.

11
12 Q At the time that you first were rendered in
13 the posture for such discussion, the Larkin set with its
14 tube had already been on the market and sold many thousands
15 of units over quite some years, is that not correct?

16 A At the time we did the design on the 70 and 71,
17 I, and, as far as I know, the people that worked for me
18 in the engineering department were totally unaware of
19 Larkin. I was not familiar with the Larkin Patent per se.

20 Now, I became aware of the Larkin Patent at some
21 time later. I would guess it to be in the order of late 1970
22 or early '71, but during the design phase I was not familiar
23 with the Larkin Patent. Maybe I should have been but
24 it had not been discussed with me.

25 Q I am thinking rather in terms of the MS-50 set

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than the patent.

A Yes, I was familiar with the MS-50 set. I had seen it, yes, sir.

2 Q Well, let's pass on from that to one other point.

3 A May I answer your question on the MS-50 because
4 obviously there was a misunderstanding on my part.

5 Q Back to a point that I am not sure we got clear.

6 Can you tell us the last person who indicated that
7 he knew somebody who didn't know that you would get
8 only a very minor additional attenuation when you extended
9 the length of a tube an additional inch or so?

10 A I don't recall having a discussion of that
11 nature at all.

12 Q During your testimony this morning you said that
13 you contributed to the esthetic design at the Unex
14 Lab effort in some manner. I don't want to change your
15 testimony. I'm trying to remind you of what you testified
16 to.

17 A Yes, sir.

18 Q What is that contribution or what was the story
19 about your making a contribution in the esthetic or ornamenta
20 area to the Unex effort?

21 A It is a rather nebulous one. It is basically
22 looking at a mechanical design, regarding the apparent --
23 how do you say it -- pleasing to the eye look. Unex had
24 different models which they evaluated in terms of eye appeal
25 and we went over the result of that data and I think that I

2 put a fairly strong bias of my own as to which I thought
3 had more eye appeal, certainly tempered by the data which
4 affected the design. Unex had a design of a connector
5 that they proposed which, for purchasing and cost
6 reasons, we went away from but we did not like the looks
7 of that connector which was sort of semi-rounded with the
8 rest of the unit. It didn't appear right.

9 I remember in specific detail suggesting to
10 make that longer if we could from a functional standpoint
11 and squaring off the basic connector.

12 Q So that there is embodied in the Model 70 and Model
13 71, both of them, some significant effort at treatment
14 of the esthetic and ornamental features of the whole
15 product, is that correct?

16 A I wouldn't call it significant but I
17 wouldn't call it so little that you could disregard it. I
18 think a good functional design includes some esthetic con-
19 sideration and I do feel that I helped in promoting a
20 design that looked esthetically reasonably pleasing within
21 the capabilities of the device.

22 Q Now I will address you to the Plantronics Model
23 43, which is the 1962 behind-the-ear effort of Plantronics
24 that never did really get off the ground.

25 A Yes.

1
2 Q As one bit of potential prior art to the Hutchings
3 effort, and to all of the six references in the Defendant's
4 Exhibit R-1, which are the six references that your counsel
5 has focused upon as references against the Hutchings design
6 patent.

7 Is it technically feasible to follow the esthetic
8 theme of these various references, a total of seven
9 that I identify for you, is it esthetically feasible to
10 follow the esthetic theme of each of these references when
11 making the transducer capsule for a headset? And if
12 not, then I'd like you to identify which ones you think
13 you simply could not feasibly follow the theme of.

14 A The following of the theme is, obviously, a
15 very general question. I think the -- all of these look
16 very much alike to each other and therefore, if you want
17 to call it that way, they follow a theme.

18 Q And my question is, is there any -- as a matter of
19 technical and functional and structural consideration, is
20 it not feasible to have followed that same esthetic
21 theme in making a headset?

22 A I think we tried to follow that theme where it
23 became practical. The differences by and large of that
24 theme have to do with having to attach a cord to the --
25 the difference between these headsets is having to attach

1 a cord to the outside which hopefully is a plug type
2 of termination so that it is readily removable. So it
3 is certainly not feasible to follow this to the
4 detail but I believe that all of these headsets, in fact,
5 follow this very theme of which you have pointed out to
6 me here.

7
8 Q By all of these headsets you mean -- can you
9 identify which headsets you mean when you refer to all of
10 these headsets that follow the theme that --

11 A I think the Plantronics headset follows the theme.
12 I think the Roanwell headset follows the theme.

13 Q So that as a matter of esthetic theme at least,
14 you draw no lines of distinction between any of the six
15 references that we have talked about, or seven with the
16 Plantronics MS-43 added in, and the StarSet or Roanwell R-70?

17 A I think they are all variations on a theme.

18 Q Insofar as esthetic style of plug is concerned,
19 this first R-70 that was submitted to Bell Lab is at
20 least in some manner substantially different from the one
21 that was ultimately used, is that not correct?

22 A In some manner it is different, that is correct.

23 Q Well, I guess that is enough on that theme.

24 Now I will show you again Defendant's Exhibit K
25 and will ask you, because we have touched on this in some

instances but not in others, which of these ever had any commercial use to your knowledge, the first one is a Flygstad reference and I think we have agreed that there is no commercial use of that to our knowledge, is that correct?

A To my knowledge there was no commercial use.

Q The second one is the MS-43, the under-the-ear model by Plantronics and that one enjoyed no commercial use, as far as we know?

A As far as I know, it had been used for a few years but not in large quantities certainly or only one item.

Q Now, I think that regardless of whether the specific hearing aid that is disclosed in the Erickson Patent filed in 1975, or the specific hearing aid of Gutner, that at least hearing aids that are of that general style in terms of being post-auricle with the ear tube over the top, those were commonly marketed regardless whether they tracked the detail of those disclosures?

A Yes.

Q Then we go to the German reference, DAS 1139549, and the German reference DAS 1132973, we have no knowledge of either of those being commercially marketed, correct?

A I have no specific knowledge of that. I have seen a hearing aid very similar to that some years ago long before I was associated with the headset industry. I do

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Mol-cross

849 :

not recall the model.

Q The Oticon hearing aid that is behind Tab 6
in Exhibit K, do we know whether that one was a
commercially marketed product?

A I can't tell you that I have seen an Oticon hearing
aid without any question.

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Q And finally, the Bryant reference is the Model 61 as to which we have had testimony already, and have a chart in Exhibit 133A as to its status.

Now, as a matter of practical economics, when you instruct a research and development group that are working for you to undertake any project, do you ever suggest whether it is economics or technical considerations or whatever, do you ever suggest that they search for and get translations of foreign language references like these German DAS references in order to get background for the development of whatever it is that has been assigned to them, have you ever done that?

A I have done it and I am currently doing it. At Pitney Bowes I am involved in a different field of this nature, and we are making very thorough searches in the field that we are associated with. We have found it to be very beneficial and helpful, yes. It is good technical information.

Now, the level to which we go is basically my level as a supervisor. I will not necessarily take those patents and, in turn, hand them out to each designer, but I am making sure that I understand what is available in the art.

1 zb-2

Mol-cross

2 By and large many of the patents, foreign patents,
3 are available in this country, but we have found in many
4 cases a foreign patent not to have been duplicated in this
5 country, and definitely have value, yes.

6 Q Did you ever do so when you were working in the
7 headset or hearing aid art? I guess you had no work in
8 hearing aids as such.

9 A I had not worked in the headset or hearing aid
10 arts. I definitely did this when I was employed at
11 Endevco or Digitran.

12 Q You testified on Monday when it comes to headsets
13 there are really only a few choices of tube location for
14 anybody to consider. Two tubes over the ear, two tubes
15 under the ear, and then divided, one over and one under and
16 it could be either one that is over and under.

17 And I believe you testified to the effect that
18 anybody who was addressing himself to headsets at all would
19 inevitably know that he had those four choices to work
20 with. Was that your testimony?

21 A Would you repeat the question? I didn't get
22 the very first part.

23 Q You testified that there are four choices.
24 Both tubes over the top --

25 A Theoretically four choices.

zb-3

Mol-cross

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2 Q Both tubes over the bottom. Then divided with
3 the input over the top and the output over the bottom and
4 divided with the input in the bottom and the output over the
5 top. You testified that those four choices were by the
6 nature of the thing, available to and I would take it that
7 everybody in the art would be aware that they had those
8 four choice to work with, is that a fair characterization of
9 your testimony?

10 A Well, when you say they had those choices to
11 work with, I think anybody in the art would be able to very
12 quickly derive that those were the four options he had, yes.

13 Q So that anybody who faced the problem might opt
14 to go one way or another, but at least he would immediately
15 conceive he was exercising an option between one and the
16 other among those four choices?

17 A I think that in some cases when he takes one
18 path and the path works well, he might have no deliberate
19 choice that he makes early in the game. If he encounters
20 any degree of obstacle to the one path he is taking, I
21 think he would very quickly see the alternate path and
22 explore that in some detail.

23 Q So that the references -- pick the German
24 references that we have here and the Guttner reference and the
25 Erickson reference, and so forth -- I may be wrong because

zb-4

Mol-cross

1 I am not sure that Erickson had an over the ear tube, but
2 if it did, the references, then, don't help in bringing
3 to mind this idea of an over the ear tube because that is
4 kind of available anyway. They don't really help. They
5 don't add anything, those hearing aid references with an over
6 the ear tube don't add anything to a man in the art would
7 have anyway?

8
9 A An over the ear hearing aid speech tube?

10 Q Yes.

11 A I think those references would very quickly jog
12 the mind into being aware of the alternatives. I think
13 that when we design something, often a glance at one thing
14 here or there will very quickly bring to mind another way of
15 doing something. Almost at a glance. So I think it
16 would be helpful.

17 Q I didn't mean to cut you off.

18 A So I say I think they would be helpful in
19 exploring --

20 Q It would be helpful if they were first separated
21 out from another 30,000 references so that you could look
22 at this one as distinguished from 30,000?

23 A Yes, sir, but you are asking me whether or not
24 these would be helpful if you had them and I answered yes.
25 I did not, I don't believe, testify that I would need those

1 zb-5

Mol-cross

2 in order for the alternative path to be obvious.

3 Q You testimony is that you wouldn't need them
4 for the alternative path to be considered?

5 A I think chances are very good that you would
6 not need them in order to be obvious that there are two or
7 three ways to go, yes.

8 Q And then let's address ourselves to another topic.
9 Suppose that Roanwell wanted a new transducer engineer, but
10 that more than that, Roanwell wanted to know about
11 Plantronics' second generation headset and specifically with
12 respect to that second generation headset, Roanwell wanted
13 information as to what Plantronics was doing about trans-
14 ducers. Were they buying them from Knowles or were they
15 tooling up to build them on their own.

16 A reasonable intelligence operation in that situa-
17 tion might be structured such that the head of engineering
18 or the vice-president of engineering would purport to be
19 interviewing a Plantronics employee about a job and then
20 purporting to find out about his qualifications, would say
21 what experience do you have about transducers and thereby
22 you would find out what Plantronics was doing about trans-
23 ducers, isn't that totally and 100 per cent the way such
24 an intelligence operation would be run?

25 A If you ran intelligence operations, that would

zb-6

Mol-cross

1 certainly be one of the way you would go. It would be
2 conceivable. All I can state to you, without any hesita-
3 tion in my mind, that when the contact was made, I was ab-
4 solutely and totally not of the intent to find information,
5 but I was intending to hire a capable engineer. On top
6 of that I am not even sure that the intelligence operation
7 had, if you want to call it that way, had begun, if it ever
8 started.

10 I believe to the best of my ability that I
11 contacted Mr. Bernardi about the possibility of coming to
12 work for Roanwell without having any kind of desire to, if
13 you want to call it this way, pirate him for his specific
14 information regarding Plantronics.

15 Q I read you, then, from Page 53 of Plaintiff's
16 Exhibit 140, which is a memorandum that you have testified
17 was written by, I believe, Mr. Potter, did you not?

18 A Yes, sir.

19 Q And it is entitled "Intelligence re PPI, Target
20 June 30," - skipping down five lines, it says that one of
21 the things that is in the objective is type of transducers
22 and suppliers, Knowles or PPI. Skipping down to the
23 specific assignments, it says, "HCM," that is Mr. Mol,
24 your initials, "interview engineer," and in response to that
25 you did in fact interview the engineer and found out

1 zb-7

Mol-cross

2 specifically about the transducers that Plantronics was
3 or was not making for itself. Your performance was in
4 full compliance with that much of the instruction on Mr.
5 Potter's intelligence memo.

6 A Your story happens to be inaccurate, sir. You
7 are deducing one as a result from the other, and I can fully
8 understand it is one of thelogical deductions. It happens
9 to be not true. I interviewed Mr. Bernardi. I spoke to
10 him. I was familiar with his capability and when Mr.
11 Potter asked me about interviewing an engineer, we had the
12 intend of interviewing him, but at that particular point I
13 was already aware that Mr. Bernardi had not done any transducer
14 design, or at least very little, so my response, and I
15 am not sure that this memo is really in response to the
16 assignment --

17 THE COURT: Let me ask you this. How did you
18 interpret the statement or entry "Interview engineer"? Did
19 you understand that to be an engineer at Plantronics?

20 THE WITNESS: Yes, sir. Without any question.
21 There is no doubt in my mind that Mr. Potter suggested
22 as one of the possibilities of getting information, is the
23 interviewing of an engineer.

24 What it really boiled down to is I had already
25

1 zb-8

Mol-cross

2 interviewed the engineer at that particular point.,

3 He was the only one that I knew of that had
4 at least shown some degree of interest, and I simply not
5 only didn't want to, but frankly was incapable of pursuing
6 it because I had already talked to the one engineer that
7 would interest me there.

8 Plantronics is not and was not at that time
9 a huge organization.

10 THE COURT: So you are saying that by the time
11 you received this memorandum you had already talked to
12 Mr. Bernardi?

13 THE WITNESS: Your Honor, to the best of my
14 ability, that is exactly true. I do know without any doubt
15 in my mind that I did not interview Mr. Bernardi with the
16 intent of obtaining information. There is no doubt in my
17 mind about that.

18 id 2B

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gwb-1

Mol-cross
redirect

1 THE COURT: That is not the question. The
2 question is whether you had talked to Mr. Bernardi before
3 you got this memorandum.
4

5 THE WITNESS: Yes, to the best of my ability,
6 I had. I responded virtually immediately to the memorandum
7 saying, "Bernardi has not worked on transducers," and
8 I volunteered that there was another man that was available
9 and should we interview him.

10 MR. ARNOLD: We have no further questions,
11 your Honor.

12 MR. BRADLEY: Your Honor, I have just one
13 question.

14 REDIRECT EXAMINATION

15 BY MR. BRADLEY:

16 Q I think there were two things combined together
17 in a question, and I wanted to make sure the record is
18 clear on the answer.

19 The two German patents in Defendant's Exhibit
20 K1, one is behind Tab 5 and the other one is behind Tab 7,
21 and the witness said that he saw one or both of these on the
22 market and I just wanted to clarify which one or was it
23 both.

24 I show you first the German DAS behind Tab 5.
25

1 gwb-2 Mol-redirect

2 A Mr. Bradley, I don't remember the one on the
3 market specifically enough with sufficient detail to
4 tell you without any question that it was one of these
5 two.

6 All I can tell you without any doubt is I saw
7 the type that had the port at the termination at the top,
8 this very same type.

9 Q I am not talking about the exact unit, but was
10 it of the type shown here?

11 A Yes, I have seen both this type and I have
12 seen the other type that had a microphone tube coming over
13 the ear to the ear canal. There are two of these in these
14 references and I cannot tell you which of those two it
15 was because I didn't look at them that closely.

16 Q Let me take it step by step. Have you seen on
17 the market the German reference behind Tab 5 where you have
18 essentially a front-facing microphone port or tube?

19 A Yes, I have seen such a device.

20 Q Have you seen a device such as shown in Figs. 1
21 and 2 in the German reference behind Tab 7, where you have
22 the microphone tube coming over the top and the receiver tube
23 under the bottom in the hearing aid?

24 A Yes, I have.

25 Q Where have you seen that?

gwb-3

Mol-redirect

1
2 A Some years ago in California. I cannot remember
3 the specific detail. I remember the one where the ear
4 tube went over the canal like this and had a little port of
5 someone that I believe I saw in an elevator I was standing
6 next to in line because of this sort intriguing shape I
7 had not seen.

8 Q Was the ear tube under the bottom, that is my
9 point?

10 A Yes, there was no doubt in my mind the ear tube
11 came on the bottom.

12 MR. BRADLEY: The reason I asked that is I had
13 never heard of that type being on the market.

14 Thank you.

15 THE COURT: Is that all?

16 MR. BRADLEY: Yes, your Honor, the defendant rests.

17 THE COURT: I want to ask just one question, if
18 I may, Mr. Mol.

19 THE WITNESS: Yes, sir.

20 THE COURT: The question came up a moment ago
21 about the amount of attenuation that would result from
22 changing the length of the voice tube from its maximum
23 extended position to its maximum retracted position, or
24 vice-versa, and I note on Defendant's Exhibit XX-1, which
25 is the frequency response curve for the R70, that the peaks,

1 gwb-4

Mol-redirect

2 the corresponding peaks, ignoring the frequency shift
3 that occurs, are an average of about three db higher
4 than the corresponding peaks for the full length extension.

5 THE WITNESS: That is correct, your Honor.

6 THE COURT: And I note on Defendant's Exhibit
7 XX2, which is the frequency response curve for the R71,
8 that the corresponding peaks are about one db apart in
9 height.

10 THE WITNESS: That is correct, sir.

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2 THE COURT: Can you account for the fact that you
3 get greater attenuation with the change in length on the
4 R-70 than you get with the R-71?

5 THE WITNESS: Well, I can, your Honor. I would
6 like to point out that these attenuation curves that
7 you are pointing out or the frequency response curves you
8 are pointing out are those without acoustic resistance.

9 In other words, it is an artificial situation
10 that in our building never occurs. We deliberately showed
11 this data in order to show --

12 THE COURT: I am fully aware of that. We are
13 talking now only about the affect of changing the length of
14 the tube.

15 THE WITNESS: There is an additional acoustical
16 cavity. Therefore, if there is no damping it will have a
17 different affect. There is no doubt about that.

18 THE COURT: That is not the question. The
19 question is why should you get a 1 db of attenuation
20 when you go from the shortest to the longest length in
21 the R-71 and 3 dbs of attenuation when you go
22 from the shortest to the longest length in the R-70?

23 THE WITNESS: Your Honor, I frankly don't
24 know. I am not sufficient of an acoustical expert to
25 answer you all the details, but I do know that it has

1 gwrf 2

Mol

2 a relation to the size of the tubing and the length of the
3 tubing and the volume. I might point out that in all of
4 these headsets, whether it is Plantronics or ours, it is
5 no longer a question of a very simple straight tube. There
6 are many steps that occur in going from the transducer
7 into the tubing and the length of each of these steps
8 and the right angles required in some against straight all
9 affect the acoustic characteristics and they are so
10 complicated that the tube is about two or three weeks of
11 varying different diameters to optimize these, and
12 I am not enough of an acoustician to tell you the reason
13 for each one of these and I am not sure that anyone could
14 predict it with great accuracy.

15 THE COURT: For the record, a 3 db attenuation
16 is equal to a 50 per cent drop?

17 THE WITNESS: Roughly, yes.

18 THE COURT: All right.

19 MR. BRADLEY: When you are talking in terms
20 of power, it is 6 db.

21 Your Honor, I just want to answer your question
22 as to the R-70 and R-71. There is a difference in
23 change of length between fully extended and retracted of
24 2-1/4 inches.

25 THE COURT: On the R-70?

2 MR. BRADLEY: The two Roanwell units, R-70 and
3 71.

4 MR. ARNOLD: The previous measurement was on the
5 StarSet.

6 THE COURT: Fine. But that still doesn't
7 account for the difference in attenuation between the
8 R-70 and R-71. That is what I can't understand.

9 MR. BRADLEY: Your Honor, did you understand that
10 on XX-1 and XX-2 the curves 1 and 2 show fully extended
11 and fully retracted when the damping is present?

12 THE COURT: I understand.

13 I take it that the plaintiff has no rebuttal
14 case.

15 MR. ARNOLD: We have no rebuttal case, your Honor.

16 THE COURT: What about our briefing schedule?
17 Do you want to exchange briefs simultaneously or does plain-
18 tiff want to open and close?

19 MR. ARNOLD: I should think exchanging simultaneous
20 so we could get to a quicker decision would probably be
21 good for everybody. I would like to do it the other
22 way but I think it works out better if we exchange briefs
23 simultaneously.

24 THE COURT: It does speed things up. You have
25 been getting daily copy. How soon can you get your

first briefs in?

MR. BRADLEY: I might say exchanging them simultaneously is not as rational as the other way so we can respond.

THE COURT: It is to your advantage, I should think, to accept his offer to exchange simultaneously. Otherwise he gets two briefs to your one.

MR. BRADLEY: It seems we could direct our attention to each other's arguments in sequence, but I have no objection. We can exchange simultaneously.

THE COURT: It is entirely up to counsel.

MR. ARNOLD: I leave it to Mr. Bradley. I will do it his way.

MR. BRADLEY: I think it makes more sense, but I don't really care much.

THE COURT: That we he gets another month before the guillotine falls.

MR. BRADLEY: I can use that.

MR. ARNOLD: I would think, your Honor, it will be a tight schedule with the record this long, but we will try to stick to 45 days for the initial brief and hopefully Mr. Bradley can work during that period and respond 30 days and we in 15.

MR. BRADLEY: Fine.

App. 1052

THE COURT: Fine. I want to congratulate both of you. You showed a lot of preparation and a lot of skill.

MR. JANICKE: With respect to the hardware, what would best be convenient to the Court, for us to retain it until briefs and then give it back to you?

THE COURT: I think you will probably want it when you are writing the briefs.

MR. JANICKE: Yes.

THE COURT: Then after all the briefs are in you can file them with the clerk or have them delivered to my chambers. Perhaps that might be better.

MR. ARNOLD: We would appreciate it. We will work with the clerk in that direction.

(Adjourned 2:40 p.m.)

WITNESS INDEX

<u>Name</u>	<u>Direct</u>	<u>Cross</u>	<u>Redirect</u>	<u>Recross</u>
Kenneth James Hutchings (Resumed)		722	728	743
Hans Cornelius Mol	744	837	858	

EXHIBIT INDEX

<u>Plaintiff</u>	<u>Identification</u>	<u>In Evidence</u>
147 through 150		722
151 through 154		725

Defendant

DDD 837

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

- - - - -x
PLANTRONICS, INC., :
Plaintiff, : CIVIL ACTION
v. : NO. 72 CIV. 1625
ROANWELL CORPORATION, : (Judge Conner)
Defendant. :
- - - - -x

STIPULATION

The parties hereby stipulate, subject to the approval of the Court, that the attached Pacific Plantronics, Inc. "Third Quarter Report To Stockholders" for the nine months ending February 28, 1969 may be received in evidence as Plaintiff's Exhibit 155. The purpose of the introduction of this exhibit at this time is to clarify a point which was raised during the trial of this case.

Dated: May 6, 1975

/s/ Lester W. Clark
Lester W. Clark
COOPER, DUNHAM, CLARK,
GRIFFIN & MORAN
30 Rockefeller Plaza
New York, New York 10020
(212) 977-9550

Attorney for Defendant

Approved by:

U. S. D. J.

/s/ Robert Neuner
Robert Neuner
BRUMBAUGH, GRAVES, DONOHUE
& RAYMOND
30 Rockefeller Plaza
New York, New York 10020
(212) 489-3300

Attorney for Plaintiff

PLANTRONICS, INC.,
Plaintiff,

ROANWELL CORPORATION,
Defendant.

STIPULATION

1. That during trial a question was raised regarding the purchase date of a certain Oticon hearing aid. (Trial Ex. 112)

2. That the attached documents are the only documents found which relate to a trip by Plantronics personnel to San Francisco, to purchase hearing aids or cases, around the time in question.

3. That, as shown on the attached documents, the Oticon was purchased by plaintiff from a hearing aid shop in San Francisco on January 2, 1969. Oticon is a Danish company, and is referred to as such on the attached expense report dated January 2, 1969.

4. That the January 6, 1969 invoice mentioned by counsel during trial was apparently for the purchase of Maico B2 hearing aid cases, as also shown on the attached documents.

5. That Bappell's hearing aid shop in Santa Cruz, which is mentioned in paragraph I.B.2. of the minutes of the December 21, 1968 engineering meeting (DX-FF), carried the Oticon hearing aid in question, as well as the Maico model BZ hearing aid, at least as early as December of 1968.

/s/ Lester W. Clark
Charles W. Bradley
Lester W. Clark
COOPER, DUNHAM, CLARK,
GRIFFIN & MORAN
30 Rockefeller Plaza
New York, New York 10020
(212) 977-9550
Attorneys for Defendant

/s/ Robert Neuner
Robert Neuner
BRUMBAUGH, GRAVES, DONOHUE
& RAYMOND
30 Rockefeller Plaza
New York, New York 10020
(212) 489-3300
Attorneys for Plaintiff

So Ordered:
Dated: June 16, 1975

/s/William C. Conner/ED
U.S.D.J.

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

-----x
PLANTRONICS, INC.,

Plaintiff,

v.

ROANWELL CORPORATION,

Defendant.

:

:

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:

:

CIVIL ACTION NO.
72 CIV 1625

(Judge Conner)

-----x

STIPULATION

AS TO

DATES OF ASSERTED PRIOR ART

The parties, by their respective attorneys,
subject to the Court's approval, hereby stipulate:

1. As to Larkin patent 3,184,556, that all
of the patents, sales literature and other publications
contained in the so-called Prior Art Book concerning this
patent, which has been designated defendant's exhibit C,
were published or filed sufficiently early to be part of
the prior art to this Larkin patent;

2. As to Hutchings patent 3,548,118, that all
of the patents, sales literature and other publications
contained in the so-called Prior Art Book concerning this
Hutchings patent, which has been designated defendant's

exhibit K-1, were published sufficiently early to be part of the prior art to this Hutchings patent;

that the translations of the German references which appear behind tabs 5 and 7 of this Prior Art Book are accurate translations; and

that the plaintiff's MS-43 headset and the Oticon hearing aid, shown in the photographs behind tabs 2 and 6, and the Maico BZ hearing aid identified in a Stipulation filed June 16, 1975, were on sale and in public use sufficiently early to be part of the prior art to this Hutchings patent;

3. As to Hutchings design patent Des. 218,173, that all of the patents, sales literature and other publications in the so-called Prior Art Book concerning this design patent, designated defendant's exhibit R-1, were published sufficiently early to be part of the prior art to this Hutchings design patent; and

that the Vanco MINI-EAR hearing aid shown in the photograph behind tab 6 of exhibit R-1, a sample of the casing of which has been designated defendant's exhibit R-2, was on sale or in public use sufficiently early to be part of the prior art as to this Hutchings design patent.

/s/ Paul M. Janicke/RN
Paul M. Janicke
ARNOLD, WHITE & DURKEE
2100 Transco Tower
Houston, Texas 77027
(713) 621-9100

Robert Neuner
BRUMBAUGH, GRAVES, DONOHUE
& RAYMOND
30 Rockefeller Plaza
New York, New York 10020
(212) 489-3337

Attorneys for Plaintiff

Dated: July 10, 1975

APPROVED:

U.S.D.J.

/s/Lester W. Clark
Lester W. Clark
COOPER, DUNHAM, CLARK
GRIFFIN & MORAN
30 Rockefeller Plaza
New York, New York 10020

Attorney for Defendant

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

-----X
PLANTRONICS, INC., :
 :
 Plaintiff, :
 :
 v. : CIVIL ACTION NO.
 : 72 CIV 1625
 ROANWELL CORPORATION, :
 : (Judge Conner)
 Defendant. :
-----X

STIPULATION REGARDING CERTAIN DEPOSITION
EVIDENCE

The parties, by their respective attorneys,
subject to the Court's approval, stipulate that the
following deposition testimony cited by Plaintiff or
Defendant in its deposition summaries and post-trial
briefs, shall be deemed to be received in evidence if
not already so received:

Bowman deposition: P. 43, line 20 to p. 48,
line 20.

Larkin deposition: Pp. 1-7; p. 8, lines 1-18;
p. 11; p. 12, lines 1-14; p. 28; p. 29;
p. 36; p. 45; p. 46; p. 48; p. 49; p. 56;
p. 60; pp. 87-89; p. 93; p. 94, line 1;
p. 98, line 8, to p. 106, line 18.

The parties further stipulate that the attached memorandum of C. P. Grahman, dated December 21, 1968, be received in evidence as Defendant's Exhibit EEE.

/s/ Robert Neuner
Robert Neuner
BRUMBAUGH, GRAVES, DONOHUE
& RAYMOND
30 Rockefeller Plaza
New York, New York 10020
(212) 489-3337
Attorneys for Plaintiff

/s/ Lester W. Clark
Lester W. Clark
COOPER, DUNHAM, CLARK, GRIFFIN
& MORAN
30 Rockefeller Plaza
New York, New York 10020
(212) 977-9550
Attorneys for Defendant

Dated: July 10, 1975

APPROVED:

U.S.D.J.

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

PLANTRONICS, INC.,

Plaintiff,

- against -

ROANWELL CORPORATION,

Defendant.

72 Civ. 1625
(WCC)

OPINION (as amended by
nunc pro tunc orders of
September 18 and 23, 1975)

CONNER, D. J.:

This is an action for infringement of two utility patents and a design patent owned by plaintiff Plantronics, Inc. (Plantronics), relating to lightweight headsets (microphone and earphone assemblies) as used, for example, by airplane pilots and air traffic controllers. The action was tried without a jury, and this opinion comprises the Court's findings of fact and conclusions of law pursuant to Rule 52(a) F.R.Civ.P.

The Parties

Plantronics, formerly known as Pacific Plantronics, Inc., is a corporation of the State of California having its headquarters in Santa Clara, California. It is the successor

of a partnership doing business as Plane Aids Company (Plane Aids). Its principal business is the manufacture and sale of headsets.

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Defendant Roanwell Corporation is a corporation of the State of New York having its principal place of business in New York City. It is also in the business of manufacturing and selling headsets.

Jurisdiction and venue are not challenged.

Plaintiff is the owner of the three patents in suit, identified below.

I. THE LARKIN PATENT

The Larkin U.S. patent 3,184,556, issued May 18, 1965 on an application filed December 11, 1961, concerns a headset which utilizes a miniature microphone and a miniature receiver mounted within a small capsule which is supported near the wearer's ear, with a self-supporting, bendable, small-diameter, acoustic tube extending from the microphone to a point adjacent the wearer's mouth, and a flexible, small-diameter, acoustic tube extending from the receiver and having at its outer end a plug inserted in the wearer's ear canal. In the illustrative headset disclosed in the patent, the capsule is provided with

a spring clip which is adapted to be clipped onto the temple bar of a pair of eyeglasses or onto a headband. A small-diameter multi-conductor cable connects the microphone and receiver to external communications equipment. Only Claim 1 of the patent is in suit. It is set forth in full in the margin.¹ It is charged to be infringed by two of the Roanwell headsets, models R-70 and R-71.

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Roanwell originally admitted the infringement of Claim 1 by both of these models, but shortly before trial withdrew that admission and now contests the charge of infringement against both.

In addition to denying infringement, Roanwell asserts the following affirmative defenses against the Larkin patent: anticipation by and obviousness in view of the prior art, lack of inventorship, fraud on the Patent Office and indefiniteness of the asserted Claim 1.

A. ANTICIPATION AND OBVIOUSNESS

In this, as in most patent infringement actions, the pivotal issue is whether the invention would have been obvious at the time it was made to a person having ordinary skill in the art, 35 U.S.C. § 103, a standard which Judge Learned Hand justifiably termed "perhaps the most baffling concept in the

whole catalogue of judicial efforts to provide postulates for indefinitely varying occasions." Lyon v. Bausch & Lomb Optical Co., 224 F.2d 530, 536 (2d Cir. 1955).

Viewed retrospectively, the Larkin invention would seem an obvious combination of old elements. But so would virtually every other invention which consists of a combination of mechanical and/or electrical components. Thus we have been admonished by Graham v. John Deere Co., 383 U.S. 1, 36 (1966), to avoid "'slipping into use of hindsight'" and

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to "resist the temptation to read into the prior art the teachings of the invention in issue" by determining the issue of obviousness under § 103 in accordance with the following uniform procedure:

"Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy." Id. at 17-18.

The "secondary considerations" referred to were apparently inspired by the repeated statements of Judge Learned Hand, for

example in his oft-quoted opinion in Reiner v. I. Leon Co., 285 F.2d 501, 503-4 (2d Cir. 1960), cert. denied, 366 U.S. 929, reh. denied, 366 U.S. 978 (1961):

"The test laid down is indeed misty enough. It directs us to surmise what was the range of ingenuity of a person 'having ordinary skill' in an 'art' with which we are totally unfamiliar; and we do not see how such a standard can be applied at all except by recourse to the earlier work in the art, and to the general history of the means available at the time. To judge on our own that this or that new assemblage of old factors was, or was not, 'obvious' is to substitute our ignorance for the acquaintance with the subject of those who were familiar with it. There are indeed some sign posts: e.g. how long did the need exist;

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how many tried to find the way; how long did the surrounding and accessory arts disclose the means; how immediately was the invention recognized as an answer by those who used the new variant?"

See also Safety Car Heating & Lighting Co. v. General Electric Co., 155 F.2d 937, 939 (2d Cir. 1946) and cases cited therein.

In most validity contests, it is these "signposts" which furnish the only objective guidance and which ultimately prove dispositive.

However, we must begin with the preliminary determinations directed by Graham.

Scope and content of the prior art

The principal prior patents and publications relied on by Roanwell in attacking the validity of Larkin are the following:

British Pritchett patent 191 (1878)

This patent, issued at the dawn of the age of telephony, shows several different types of microphone and receiver combinations designed to leave the hands free for writing and other functions, the version most relevant here being that of Figure 5. That device includes a single transducer for both transmitting and receiving, contained in a rather large and cumbersome horn-shaped housing resembling an

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inverted receiver from an old pedestal-type telephone which is adapted to be suspended from a clip on the wearer's lapel. A rigid tubular column projects from the large upper end of the housing to a point opposite the wearer's ear and a rigid horizontal tubular extension at its upper end projects into the ear canal. A smaller diameter voice tube projects forwardly and upwardly from the housing, and a small horn at its outer end is positioned in front of the wearer's mouth.

There is no evidence that this device, implausibly designed by an architect, was ever constructed, much less marketed,

and there is considerable doubt as to its practicability. Movements of the wearer's head, if they were permitted at all by the spike-like column impaling the wearer's ear, would vary the distance from the mouth to the voice tube and accordingly the amplitude of the transmitted signal.

Olney et al. U.S. patent 2,485,405 (1949)

Olney, which was cited and considered by the Patent Office during prosecution of the Larkin application, shows a head-set consisting of a single "platform" type earpiece which lies flat on the auricle or external ear and is supported by a resilient metal headband extending over the top of the wearer's head, and which contains both the receiver and the microphone, with a dual acoustic tube cantilevered from the earpiece and extending to a point adjacent the wearer's mouth. The

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two voice tubes are respectively connected to opposite sides of a dual-chambered input housing, and to opposite sides of the microphone diaphragm, so that "noise" or extraneous sound waves from remote sources which are substantially equidistant from the inlet orifices at opposite ends of the input housing impose substantially equal and opposite pressures on the diaphragm and are thus effectively cancelled out. This noise-cancelling dual voice tube arrangement is described as optional and replaceable by a single voice tube.

As far as the record shows, the Olney device was never commercialized.

The Western Electric WE 52 headset

The WE 52, which was standard equipment for telephone operators in the Bell System during the 1950's, is similar in configuration to the Olney headset, having a single platform earpiece supported by a headband, with a microphone supported in front of the wearer's mouth by a boom cantilevered from the earpiece.

In practice, this headset proved uncomfortable when worn for long periods and also unstable, as rapid head movements tended to cause the platform earpiece to slide on the ear, with resulting displacement of the microphone relative to the mouth.

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Dreher et al. U.S. patent 2,904,640 (1959)

Dreher, also a file wrapper reference against Larkin, discloses a headset having a molded plastic body shaped to fit into the concha of the ear with an integral, tubular extension projecting into the ear canal. The body supports a single transducer used for both transmitting and receiving under control of a remote push-to-talk switch. A rigid, bendable voice tube

cantilevered from the body has at its outer end an intake cup positioned in front of the wearer's mouth.

This device, which was not widely used, if it was marketed at all, has the disadvantage that the earmold insert must be shaped and sized to fit the individual wearer, and must always be worn on the same side of the head. The stability of the headset is also highly questionable.

The Telex headset (1959)

This headset incorporates the widely used Telex "Twinset," a receive-only headset shown in the Gilbert U.S. patent 2,586,644 issued in 1959, which had a resilient metal headband with a small plastic housing at each end adapted to lie against the side of the head adjacent one of the ears and containing a small receiver. A rigid, curved ear tube was rotatably mounted on each housing to permit adjustment of the portion of its outer end, which was provided with a plug to fit into the ear canal. A Telex flyer published in 1959 shows

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a modification of this device having a microphone boom cantilevered from one of the housings with a microphone at its outer end adjacent the mouth.

The mass of the microphone at the outer end of the boom, with its substantial moment arm, created a problem of stability.

The Spencer-Roberton article (1960)

This article in a technical publication shows the headset which at that time was standard equipment for telephone operators in Great Britain. Like the Olney headset, it includes a single headband-supported platform earpiece containing a microphone with a cantilevered, bendable, segmented input horn, mounted for rotation about the axis of its small end to permit proper positioning of its enlarged input end in front of the wearer's mouth.

Henderson U.S. patent 2,939,923 (1960)

Henderson discloses hearing aid earpieces of several configurations, the most relevant probably being that of Figures 4 and 5, which has a small cylindrical housing containing a receiver which is supported from a flexible acoustic tube which extends over the top of the ear and terminates in a plug adapted to fit into the ear canal, the tube extending through an optional molded insert shaped to fit the concha of the ear for enhanced stability. A lightweight cord connects

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the earpiece to an external housing containing an amplifier and a microphone which, for example, may be carried in the pocket of the wearer's shirt or jacket.

Guttner et al. U.S. patent 3,209,080 (filed 1961)

Guttner discloses a self-contained hearing aid of the "post-auricular" type having a curved housing adapted to fit behind the external ear, with a hook-like extension at one end adapted to engage the upper front edge of the auricle. The housing contains a microphone, amplifier and receiver, with the latter communicating with a flexible acoustic tube which extends from the end of the hook-like extension and terminates in a plug fitting into the ear canal. Incoming sound waves reach the microphone through a short passageway of small diameter which opens at the front side of the hook-like extension.

The differences between the
claimed invention and the prior art

All of the individual elements of the combination recited in Claim 1 are shown by the prior art. However, no single item of prior art shows the complete combination.

Roanwell contends that Pritchett (Figure 5) and Dreher each fully anticipate Claim 1. Neither does so.

In Pritchett, there is not a "miniature microphone and a miniature" receiver as called for in Claim 1, but a single large

and ungainly transducer. Nor is there "support means for detachably supporting the miniature microphone and miniature receiver adjacent to the wearer's ear," as further called for. In Figure 5 of Pritchett, the transducer housing is suspended against the wearer's chest.

Dreher likewise has only a single miniature transducer for both transmission and reception. Dreher further lacks "support means for detachably supporting the miniature microphone and the miniature receiver adjacent to the wearer's ear," and "a second acoustical tube, and means for attaching one end of said second tube to said receiver and the other end of said second tube being adapted to be plugged into the wearer's ear," in the sense intended by Claim 1. In Dreher, the earmold housing supports the transducer not adjacent to the auricle, but in it. Moreover, to read Claim 1 on Dreher would require a multiple inclusion: the one-piece earmold insert would have to be, at one and the same time, 1) the "support means," 2) the "second acoustical tube," and 3) the "means for attaching one end of said second tube to said receiver." Finally, the portion of the claim that reads "the other end of said second tube being adapted to be plugged into the wearer's ear" suggests that the ear receives only the end of a tube which extends for some distance outside; in Dreher, the entire tubular extension projects into the ear canal.

However, I do not agree with Plantronics' further argument that Dreher's tubular extension is too short to be an "acoustical tube" because that expression is applicable only to tubes of sufficient length (e.g., 1-1/2 inches) to exhibit resonance peaks and nulls in the audio frequency range. I find no basis, in the specification or elsewhere, for reading any such limitation into Claim 1, and I therefore interpret the term "acoustical tube" as encompassing any tube which carries sound waves.

Nevertheless, I conclude that Claim 1 is not anticipated by any single item of prior art.

With the always perfect guidance of hindsight, it is easy now to see how the claimed combination could be assembled by properly selecting individual elements or even groups of elements from the various prior art devices. For example, Guttner disclosed a housing containing a miniature microphone and miniature receiver, with the latter communicating with a flexible acoustic tube terminating in an ear plug. Olney taught an acoustic tube extending from a point near the wearer's mouth to a microphone in the same housing that contains the receiver. Adding Olney's voice tube to Guttner's device, and modifying Guttner's electrical circuit, as also taught by Olney, so that the microphone and the receiver, instead of being connected to one another through an amplifier, are connected to separate external transmitting and receiving

circuits, would produce the complete combination recited in Claim 1 of Larkin.

This assumes, of course, that the claim is interpreted, as Plantronics contends it should be (and as it must be for it to be infringed by the accused Roanwell headsets), so that the "support means" covers a post-auricular housing hooking over the ear and not merely the eyeglass clip-on capsule illustratively shown.

However, no such combination of the elements of Buttner and Olney was suggested by either. Since there are rarely any new elements, virtually any combination of elements ever claimed could be thus pieced together by properly selecting individual elements from the infinite parts bin of the prior art. As Judge Learned Hand repeatedly observed, for example, in Safety Car Heating & Lighting Co. v. General Electric Co., supra at 939:

"Substantially all inventions are for the combination of old elements; what counts is the selection out of all their possible permutations, of that new combination which will be serviceable. No objective standard is practicable; (Kirsch Manufacturing Co. v. Gould-Mersereau Co., 2 Cir., 6 F.2d 793; Potts v. Coe, 78 U.S.App.D.C. 297, 140 F.2d 470; as, for example, whether each of the elements operates in a different way from what it did in other combinations. That is almost never true of a machine; each member ordinarily performs the same

mechanical function which it does in any other machine; it is their cooperation that produces the result, and the value of that cooperation depends upon the sagacity which divined the end and fabricated the means."

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See also B.G. Corp. v. Walter Kidde & Co., 79 F.2d 20 (2d Cir. 1935); Kirsch Mfg. Co. v. Gould Mersereau Co., 6 F.2d 793, 794 (2d Cir. 1925). Judge Medina made a more recent statement to the same effect in Ling-Temco-Vought, Inc. v. Kollsman Instrument Corp., 372 F.2d 263, 268 (2d Cir. 1967).

Thus, as virtually always, we must ultimately resort to a review of the history of the art before and after the invention. Incidentally, such a review, in combination with the prescribed prefatory analysis of the prior patents and publications, is also usually the best, and frequently the only, way to determine "the level of ordinary skill in the art" as further directed by Graham.

The history of the art

The Air Force Panel

In 1956, the United States Air Force found all the headsets then available so unsatisfactory that it initiated a

survey which involved convening a Panel of Experts to canvass all the possible alternatives.

The 1959 report of that Air Force projects reads in part:

"Objective of the Program

"The basic purpose of the program was to discover and explore improved means for voice communication during Air Force Operations. * * * Improvements are desired which will:

"(a) decrease the size, weight and discomfort associated with the equipment which must be worn on or about the head of the flier; * * *

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"The discomfort of flying headgear is to a large degree attributable to the interphone equipment. * * * The degree of discomfort which we are concerned with here is in the category of intolerable. Specifically, the complaint has been called ear torture. It is reported as being of such degree as to detract from the operational effectiveness of flying personnel on long range bombing missions. If a man is supposed to wear his helmet for the duration of a flight, but cannot because of intolerable pain, and without it he is not only inadequately protected, but cannot be adequately supplied with oxygen, and is inadequately prepared for emergency flight conditions, then the condition is an operational hazard. Hence, elimination of discomfort has been an urgent necessity." (Emphasis added)

* * *

"The first step in the program was to assemble a team, including some of the most competent experts in the field from all over the country. The program has been guided by a Panel of Experts consisting of ten individuals or groups having great experience in all aspects of the problem: electro-acoustic transducer design * * * "

This Panel of Experts prepared a list of all the known types of transducers, means for coupling them to the audio source and to the ear, and means for excluding unwanted signals or "noise." It recommended for further investigation several types of microphones and coupling systems, none of which was used in the Larkin headset. It produced no solution to the recognized problem of "ear torture."

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United Air Lines

In 1960, United Air Lines was using a headset designated HS-33, which was a receive-only unit of the "circumaural" type, with each of the two receivers supported at the center of an "earmuff" or padded ring surrounding one of the external ears, so that the pressure was applied against the adjacent portions of the head rather than the ear itself, and with the two muffs connected by a resilient metal band extending over the top of the head. A separate hand-held microphone was used for transmission. In a memo of June 30, 1960, United's Engineering Vice President, Mentzer, described the HS-33 headset model as "large, cumbersome, and uncomfortable to wear," and the hand-held microphone as "relatively large, heavy, elusive and awkward."

United had experimented with Western Electric's WE 52 headset, which weighted about half a pound, and consisted of a single "platform" type earpiece which contained the receiver and which was supported by a resilient metal headband. The microphone

was supported in front of the wearer's mouth, on an adjustable metal boom cantilevered from the earpiece.

United found both the WL 52 headset, and a similar Telex headset, which it also tested, unstable; if the wearer moved his head quickly, they would tend to slide out of position or even fall off.

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The Mentzer memo of June, 1960 included a photograph of a typical eyeglasses-contained hearing aid of the type then commercially available, having the amplifier housed in an enlarged temple bar and a flexible acoustic tube plugged into the wearer's ear canal.

The Mentzer memo suggested a similar approach to the problem of a lightweight headset, and included another photo of a mockup in which conventional eyeglass frames were used to support a round button-type hearing aid receiver in the concha of the ear, with a tubular extension projecting into the ear canal, and with a microphone suspended in front of the mouth by wires connected to opposite sides of the eyeglass frames. This suggestion was never developed beyond this inoperative mockup. Believing it to be "too far off for our urgent need," Mentzer's superior, J. M. Hodgson, in August 1960 ordered United's San Francisco engineering group to "review the market to determine what is available in the headphone/boom mike field," and to procure samples for evaluation. This task was assigned to two

United engineers: Austin F. Trumbull, who was Superintendent of Electronic Engineering, and one of his engineers, Merlin Leonhardt.

Leonhardt proceeded to contact some 20 to 25 U.S. and foreign vendors in the headset field, including Roanwell, requesting information on available lightweight headsets, with transistorized amplifiers and dynamic microphones. Nineteen

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companies replied. Twelve of the nineteen said they could not meet United's requirements; the remaining seven, including Roanwell, sent brochures or submitted sample units. None was found satisfactory by United.

One of the samples submitted was from Airmed, Ltd., of Great Britain. The Airmed unit weighed about a pound, had two circumaural muffs connected by a metal headband, and a boom microphone mounted in front of the mouth. United evaluated this headset as a good boom-microphone headset for the state of the art at that time, but still too clumsy, and unacceptable for United's needs.

A brochure submitted by Amplivox showed a headset called "Amplilite," which was similar to the Airmed. Because of the similarity, a sample was not requested. It was judged also unsatisfactory because of its clumsiness -- even though it was being promoted by its manufacturer as combining lightweight wearing comfort with a robust construction.

Carter Engineering submitted a headset sample, also employing two ear muffs, headband and boom mike suspended in front of the mouth. United found this unit to be "very cheaply constructed" and "quite uncomfortable after one hour of wearing," and similarly rejected it.

Roanwell submitted a brochure, but it did not disclose any new lightweight assemblies. Telephonics promised to submit a sample, but never did.

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Telex submitted a prototype which was a modification of its Twinset with a boom microphone mounted in front of the mouth, similar to the combination shown in the aforementioned Telex flyer.

United evaluated the Telex unit, and found that, although it was relatively light (a quarter to a half pound), it was still "not what we were looking for." The substantial mass of the microphone, cantilevered in front of the mouth, some distance from the point of support, caused it to be unstable; its movement away from the mouth reduced the output of the transmissions.

United thus found no suitable lightweight headset through this search.

During 1960-61, Plane Aids sold under the name "Sun & Fun" a transistor radio mounted in an enlarged temple bar of a pair of sunglasses, with a flexible acoustic ear tube extending from the temple bar and having at its outer end a plug fitting into the wearer's ear canal. Upon seeing a promotional flyer for this unit, Trumbull of United, over the signature of Mentzer, wrote to Plane Aids, advising that United was interested in some of the techniques involved in the radio sunglasses, but for a different application. After an initial meeting between the patentee, W. Keith Larkin, then president of Plane-Aids, and Trumbull and Leonhardt of United, in which Trumbull

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explained United's needs, Plane Aids commenced a project for development of a headset to satisfy those needs.

This project resulted in the Plantonics headset, identified as MS-50, a commercial adaptation of the headset described and claimed in the Larkin patent in suit, which was tested by United and adopted as standard for all of its aircraft. This unit, which has previously been described, weighed about one ounce, was comfortable and compact, could be worn on either side of the head, had good audio characteristics, and permitted intra-cockpit conversations.

Pan American and a number of other airlines subsequently followed United's lead and likewise standardized on the MS-50.

Federal Aviation Administration (FAA)

An official FAA report entitled "Development of Lightweight headset," dated February 1963, described the long-existing need for such a satisfactory headset as follows:

"For many years the Agency has sought an improved headset which could be worn by controllers for long periods of time without discomfort and yet provide adequate transmission and reception capabilities. The headsets normally issued have been described by the controllers as bulky, heavy, uncomfortable, and cumbersome. They have been known to produce headaches and sore ears after continuous wear, and have caused interference with normal activities such as eating and smoking."

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In attempting to overcome these problems, the FAA had organized an in-house development effort, described in the report as follows:

"Numerous attempts have been made to provide improved headsets both by requests to the telephone companies and by investigation of commercially available items for possible use by air traffic controllers.

"Several commercially available items have appeared promising and have been privately purchased and tried with some favor. Foremost of these were the Telex headsets and various hearing aid receivers which employed earpieces to fit inside the ear, thereby eliminating the earcups and pads which were

a major cause of discomfort. Minor modifications were made to the currently used Western Electric Type 52 headset from time to time, but there were no major improvements.

"A number of the most promising commercially available items were purchased and sent to the National Aviation Facilities Experimental Center for tests of their acoustical characteristics. The plan was to determine the most suitable transducer elements for transmitting and receiving and to develop an improved headset using these elements as a basis."

This search ended when the FAA saw the Plantronics MS-50. As stated in the official report:

"In September, 1961, representatives from Plantronics, Incorporated, came in with an idea and a proposal. The headset which they proposed to develop appeared so ideally suited for air traffic control use that the previously planned in-house development effort was discontinued."

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A comparative evaluation of the best available headsets was conducted by the FAA, involving forty air traffic controllers with "a cross-selection of different usage, head shapes and sizes, ages, and environment." The test was among the Plantronics MS-50, a new headset supplied by Bell Telephone Laboratories, called the Y-1, and the then-standard WE 52. The Y-1 was essentially a lighter version of the WE 52, in which the WE52's front-mounted boom microphone was replaced by an exponential horn extending from a microphone mounted on

an earphone of the same configuration as that used in the WE 52. The Y-1 was thus similar to the standard British telephone headset, as disclosed in the Spencer-Roberton 1960 article.

After several weeks' use of each of the headsets, 77% of the controllers expressed a preference for the MS-50, with 89% rating it the most comfortable. Additionally, and somewhat surprisingly in view of the miniature transducer used in the MS-50, the controllers found the MS-50 to be more satisfactory in the respect of audio characteristics than either the Y-1 or the WE 52. The FAA accordingly standardized on the MS-50 for air controller use.

National Aeronautics and Space Administration (NASA)

According to Mr. George Metcalfe, a NASA Communications Specialist responsible for the issuance and maintenance

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of headsets at Cape Canaveral and later at the Manned Spacecraft Center in Houston, in the use of all the headsets known and available in 1961, including the WE 52 then standard for NASA ground controllers, "[t]he fatigue problem was a major complaint."

After becoming aware of the Plantronics MS-50, despite initial opposition to it by Metcalfe, virtually all the NASA

ground controllers adopted it. Metcalfe also was ultimately won over, referring to the MS-50 as

"an excellent headset. * * * * lightweight. You can wear it for eight hours without caving in. And it has been a fantastic improvement over the WECO 52 headset."

The MS-50 was accordingly adopted as standard equipment at NASA.

Market impact

The Plantronics MS-50 has enjoyed substantial commercial success. Over 700,000 units have been sold. Even after the introduction of Plantronics' later model "Starset" (a post-auricular headset which is the subject of the Hutchings utility patent, and is also claimed to come within Claim 1 of the Larkin patent), many users continued to buy the eyeglass-mounted MS-50 in preference to it.

The MS-50 was the first headset designed by an outside manufacturer to be approved for use in the Bell Telephone system.

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This experience caused Bell, which had long opposed the use of miniature transducers, to accept and even favor them.

Other headset manufacturers also became converts. Amplivox which had submitted an unacceptably heavy headset to United

Aircraft, produced a new headset called the "Minilite" which was similar to Larkin's. Electro-Voice later submitted to United Aircraft a similar model.

Roanwell

In 1962, Roanwell obtained and evaluated an early commercial unit of the MS-50 headset. Its reaction was favorable to the point of envy. Roanwell's engineers stated:

"It seems that Plantronics has come up with a combination of user comfort, low weight, high versatility, and adequate voice transmission which has gained them appreciable acceptance (Project Mercury) in a relatively short time."

And Roanwell's management expressed agreement with their engineers' conclusion that the Plantronics headset, "may be the basis of a new generation of headsets." It accordingly authorized a project to produce a similar headset. As one of their engineers on the project, Mr. Foley stated:

"It was essentially a copy of the MS-50 from Plantronics, one of their models with some slight changes to make it look slightly different."

This Roanwell project continued for a year or more; tooling was acquired and a parts inventory purchased. For reasons unexplained by Roanwell, the project was abruptly terminated around December 1965, before commercial production had begun.

The reason apparently lay in the fact that the Larkin patent had issued in May of 1965. Six weeks later, in July 1965, an attorney for Plantronics wrote to Roanwell indicating that Plantronics had been informed that Roanwell was designing a copy of the Plantronics headset on the assumption that it was not protected by a patent, and supplying a copy of the issued Larkin patent with an admonition that any infringement of it would result in appropriate legal action.

SUMMARY

All of the "signposts" thus appear to point in the direction of non-obviousness.

The record establishes that there was a long-recognized need for a lighter, more comfortable headset to eliminate the fatigue and pain, rather extravagantly termed "ear torture," involved in the wearing of all previously known headsets over extended periods. A number of organizations with access to the best minds in the field, including the airlines, the

U.S. Air Force and FAA, as well as the industry suppliers whom they consulted, had been actively searching over a number of years for an answer to the problem, but had found none, despite the availability of all the components ultimately

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employed by Larkin. When Larkin's headset was publicly disclosed, it received almost immediate recognition as an elegant and ingenious solution. It enjoyed impressive commercial success. It revolutionized thinking in the headset industry, overcoming ingrained prejudices, and its concepts have been widely copied by competitors, one of whom aptly termed it the progenitor of a "new generation of headsets."

These same factors have been characterized by Judge Learned Hand as the strongest possible proof of patentable invention. In Lyon v. Bausch & Lomb Optical Co., 224 F.2d 530, 535 (2d Cir. 1955), he stated:

"The most competent workers in the field had for at least ten years been seeking a hardy, tenacious coating to prevent reflection; there had been a number of attempts, none satisfactory; meanwhile nothing in the implementary arts had been lacking to put the advance into operation; when it appeared, it supplanted the existing practice and occupied substantially the whole field. We do not see how any combination of evidence could more completely demonstrate that, simple as it was, the change had not been "obvious * * * to a person having ordinary skill in the art" --
§ 103.

Indeed, as simple as the invention now appears, it would seem presumptuous to the point of arrogance to conclude that it was "obvious" to persons of ordinary skill in the art, notwithstanding their lengthy and unsuccessful struggle to achieve such results. As I recently wrote for the Court of Appeals in Timely Products Corp. v. Stanley Arron, F.2d (2d Cir. 1975):

"We can conceive of no better way to determine whether an invention would have been obvious to persons of ordinary skill in the art at the time, than to see what such persons actually did or failed to do when they were confronted with the problem in the course of their work. If the evidence shows that a number of skilled technicians actually attempted, over a substantial period, to solve the specific problem which the invention overcame and failed to do so, notwithstanding the availability of all the necessary materials, it is difficult to see how a court could conclude that the invention was "obvious" to such persons at the time.

I accordingly conclude that the invention defined by Claim 1 of the Larkin patent is not invalid on the ground of obviousness under 35 U.S.C. § 103.

B. INVENTORSHIP

Roanwell contends that the Larkin patent is invalid on the further ground that the claimed invention was conceived not by

Larkin but by William Bowman, an electronics technician who was employed by Plane-Aids in 1961, shortly before the first prototype was submitted to United Aircraft.

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This contention is based entirely upon Bowman's uncorroborated deposition testimony that at the time he was hired by Plane-Aids, Larkin had been working on a balsa wood mockup shaped like Plane-Aids' "Sun & Fun" radio sunglasses with a boom microphone added, and that, upon being asked to evaluate it, he told Larkin that it offered nothing new and that he would like to explore some ideas of his own. Thereafter, according to Bowman, he tested a voice tube extending from a miniature microphone mounted on the temple bar, in place of the boom microphone, and when he showed it to Larkin and to Graham, a United Airlines pilot who was Plane-Aids' chief executive officer, they were surprised that it worked; and the balsa wood mockup was accordingly abandoned in favor of a pair of Dahlberg hearing aid eyeglasses having attached to the large temple bar a microphone with a voice tube extending from it.

This testimony was flatly contradicted by Larkin, who said that he suggested the voice tube to Bowman who was initially dubious of its operability because such tubes were known to exaggerate bass tones. Larkin says that, although his knowledge of acoustical tubes was "zero," he envisioned that this

bass accentuation might tend to "offset the tinniness we were encountering" in the audio output of the miniature microphone, an assumption which was later proved correct.

[29]

Larkin's testimony was corroborated by a notarized invention disclosure document which he prepared and executed on July 7, 1961, and by the deposition testimony of a Mr. Burnell, who was one of the three or four full-time employees the company then had, and who is now unconnected with Plantronics and is thus a disinterested witness.

There is a prima facie presumption that the claimed invention was conceived by the named patentee, a presumption which has been said to be rebuttable only by evidence which is "clear, strong and convincing." Cummings v. Moore, 202 F.2d 145, 148 (10th Cir. 1953). Plantronics argues that Coffin v. Ogden, 85 U.S. (18 Wall.) 821, 823 (1874), would require proof "beyond a reasonable doubt," but I need not decide whether that standard is applicable here, since Roanwell has failed to establish Bowman's alleged origination of the invention by even a simple preponderance of the evidence.

Roanwell also argues that it was Bowman who suggested mounting the microphone and receiver in a capsule which clips onto the frame of the eyeglasses. Roanwell has failed to

establish even this much, but it would be of no consequence if it had, because Claim 1, the only claim of Larkin in suit, does not recite the clip-on capsule.

C. FRAUD ON THE PATENT OFFICE

Roanwell further contends that the Larkin patent is invalid on the ground of fraud in the prosecution of application

[30]

for the Larkin patent, in that the original claims covered a miniature headset with an acoustical voice tube, without mentioning the ear tube and, after the claims were rejected on the basis of the Dreher patent disclosed above, they were amended by adding the recitation of a second acoustical tube extending into the ear, with the "Remarks" accompanying the amendment asserting that Dreher "only has one tube." Roanwell argues that Larkin and his attorneys not only knew that Dreher also had an ear tube, but they also knew of many other devices that had ear tubes, including Plane-Aids' own "Sun & Fun" radio sunglasses and the Dahlberg hearing aid eyeglasses, both of which Larkin had used in constructing early prototypes of his headset.

Insofar as Dreher's disclosure is concerned, the Patent Office examiner had the patent itself before him, and knew just as well as Larkin what it disclosed. In arguing that Dreher

has only one tube, Larkin's attorneys clearly meant only that Dreher did not have an ear tube in the sense intended by Claim 1.

When the language of Claim 1 is interpreted in the context of the complete claim and in the light of the specification, as it must be, the "second acoustical tube" is seen to refer to a flexible tube which extends from a receiver on a support means located adjacent to (but not in) the external ear and which has at its outer end a plug fitting into the ear canal. In arguing that Dreher has only one tube, Larkin's

[31]

attorney obviously meant that Dreher has no ear tube of this type. He surely did not mean, as Roanwell implies, that Dreher has no ear tube at all, because the examiner was obviously aware that Dreher's earmold insert has an integral tubular extension which projects into the ear canal.

Nor was there any apparent deceptive design in Larkin's failure to disclose to the Patent Office the use, in prior devices, of flexible ear tubes plugging into the ear canal. The same examining division which handled the Larkin application was also responsible for examining applications on hearing aids. And it was a matter of common knowledge in the art that post-auricular hearing aids had been provided with such ear tubes. Larkin was surely not trying to conceal such a well-known fact.

Nor was there any reason for him to do so. He was not claiming any novelty in ear tubes per se, but only in the complete combination which included a support means adjacent the ear supporting a miniature microphone and a miniature receiver with voice and ear tubes extending respectively from them.

Roanwell has thus failed to establish any material misrepresentation or concealment by Larkin, much less the required intent to deceive or reckless disregard of the duty of candor. Xerox Corp. v. Dennison Mfg. Co., 322 F.Supp. 963, 969 (S.D.N.Y. 1971).

[32]

D. INFRINGEMENT

After initially conceding that both its R-70 and R-71 headsets infringe Claim 1 if it is valid, Roanwell now contends that the portion of the claim that calls for "support means for detachably supporting the miniature microphone and the miniature receiver adjacent to the wearer's ear" is not applicable to the post-auricular housing hooking over the auricle which is employed in both the R-70 and the R-71.

Roanwell argues that in their headsets, the microphone and receiver are not supported "adjacent to the wearer's ear" but on it. The short answer is that both conditions are met --

the transducers are supported adjaCent to the ear, in the sense of proximity, and are supported on the ear in the sense that their weight is carried by the ear. Thus I encounter no difficulty in concluding that the language of Claim 1 is literally readable in its entirety, on both the R-70 and R-71.

How ~~so~~ that is not the end of the matter. The last sentence of 35 U.S.C. § 112 provides that

"An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof."

[33]

The question thus remains whether the ear-hook arrangement of the Roanwell headsets is an "equivalent" of the eyeglass-clip supporting means disclosed in the Larkin patent. I find that it is. In both structures, the housing is supported on the side of the head adjacent to (but not in) the ear, with its weight supported, at least in part, on the top of the ear, eliminating the clamp-type headbands and the inward pressure they imposed either on the ears themselves or on the sides of the head adjacent the ears, which had characterized virtually all the commercially available headsets prior to Larkin.

I therefore conclude that Claim 1 is infringed by both the R-70 and the R-71.

E. DEFINITENESS

Roanwell's entire argument with respect to the alleged indefiniteness of Claim 1 consists of a single sentence to the effect that if the claim is interpreted to cover any support means other than the eyeglass frame clip-on structure illustratively disclosed, it would lack the precision required by 35 U.S.C. § 112. That argument is not persuasive. Its uniform adoption would render "means" claims useless and effectively repeal the last sentence of Section 112, a result I cannot accomplish judicially and would not if I could. As the courts have repeatedly observed, no patent would be worth much if its

[34]

coverage were limited to the precise structure shown in the drawings. Indeed, the doctrine of equivalents was judicially created to protect inventors by broadening the coverage of their patent claims beyond their literal language to encompass structures achieving the same result by similar means. Surely such protection should not be denied one whose claims require no such broadening but are squarely readable on the accused devices.

I conclude that Claim 1 has the definiteness required by Section 112.

II. THE HUTCHINGS UTILITY PATENT

The Hutchings patent U.S. 3,548,118 (the Hutchings utility patent), issued December 15, 1970 on an application filed July 3, 1969, involves a "post-auricular" (behind the external ear) headset which includes a housing curved to fit the contour of the rear surface of the auricle and having at its upper end a hook-shaped projection which engages the upper front edge of the auricle to support the housing against the ear. The housing likewise contains a miniature microphone and receiver. A voice tube extends from the forward end of the portion of the housing which projects above the ear, obliquely downwardly and forwardly to a point adjacent the wearer's mouth, and a flexible, small-diameter ear tube extends from

[35]

the lower end of the housing, underneath the ear and is provided at its outer end with a plug which fits into the ear canal. The voice tube has telescoping sections to permit adjustment of its length, and its inner end is supported in a ball and socket connection to permit lateral movement of its free or input end for proper positioning relative to the wearer's mouth. Only Claim 1 of this patent is in suit; it is set forth in full in the margin.² It is charged to be infringed only by the Roanwell R-70.

Roanwell admits that this claim, if valid, is infringed by the R-70 but asserts the following affirmative defenses against

the patent: obviousness in view of the prior art, fraud on the Patent Office, and double patenting in view of the design patent.

A. OBVIOUSNESS

Scope and content of the prior art

In its attack on the Hutchings utility patent, Roanwell relies upon the following principal items of prior art in addition, of course, to the Larkin patent:

The Plantronics MS-43 (1962)

In 1961, even before the MS-50 was placed on the market, Plantronics began work on a post-auricular headset having the microphone and receiver contained in a small capsule curved to fit the rear side of the auricle, with an ear tube extending out of its upper end, over the top of the auricle and terminating in a plug fitting into the ear canal, and a voice tube extending from its lower end under the ear and generally horizontally to a point adjacent the corner of the mouth. The first prototype, which was fabricated at Audiotone in Phoenix, Arizona, in the spring of 1962, was produced by modifying an Audiotone Model 77 post-auricular hearing aid. Several units were built and, although none was sold, they were given away and admittedly went into public use in 1962. Thus the unit is part of the prior art from which the alleged advance of the Hutchings patent must be measured. See Application of Foster, 343 F.2d 980 (C.C.P.A. 1965), cert. denied, 383 U.S. 966, reh. denied, 384 U.S. 934 (1966).

[37]

German provisional patent (DAS) 1,132,973 (1962)

This German patent discloses a post-auricular hearing aid in which the microphone input is through a tube which extends from the top of the capsule, hooks over the top of the auricle and terminates at a point near the center or focus of the auricle, while the ear tube extends from the lower end of the capsule, curves beneath the ear lobe and terminates in a plug fitting into the ear canal.

Flygstad et al. U.S. patent 3,280,273 (1966)

The Flygstad patent, based on a 1963 application assigned to Telex, discloses a post-auricular headset developed at Telex which was substantially identical to the MS-43. Like the MS-43, it was apparently never marketed.

The Oticon hearing aid (1968)

The Oticon device, as illustrated in a 1968 publication, is similar to that shown in the above German patent, except that both the voice tube and the ear tube project from the top of the capsule. This device was widely marketed, and Plantronics acquired one in its development of Hutchings' post-auricular headset.

The Bell System Model 61 headset (1965)

The Model 61 was the end result of a development program begun at Bell Telephone Laboratories in 1963. It

[38]

became the subject of the Bryant et al. U.S. patent 3,440,365 which Bell Laboratories obtained in 1969 on an application filed in 1965. It had a capsule containing a miniature microphone and receiver removably attached to an interchangeable earmold insert fitting the concha of the ear and having an integral tubular extension fitting into the ear canal and communicating through a passage in the insert with the receiver.

This device was used as standard equipment by operators in the Bell System during the late 1960's. In December 1968, after soliciting quotations from a number of independent suppliers, including Plantronics, Western Electric Co. awarded to Roanwell a contract to supply headsets of this design for use in the Bell System.

The differences between the claimed
invention and the prior art

The Plantronics MS-43 and the headset shown in Telex's Flygstad patent each anticipate the complete combination claimed in Claim 1 of the Hutchings utility patent, except for a reversal

of parts: the microphone and voice tube are at the top of the capsule and the receiver and ear tube are at the bottom, instead of vice versa.

The reverse arrangement was old in the hearing aid art. The German patent shows a hearing aid having the microphone and voice tube at the top of the capsule and the receiver and ear tube at the bottom.

[39]

The level of ordinary
skill in the art

No significant technical problem was involved in transposing the positions of the voice and ear tubes. Plantronics argues that the increase in the length of the voice tube from about 4" to about 6," which is necessitated by extending the tube obliquely downwardly from the top of the ear to the mouth instead of horizontally from the bottom of the ear, would increase the attenuation to a degree which the art would have considered intolerable prior to Hutchings.

I do not believe that audio technicians would have considered the mere 1 or 2 decibels of added attenuation a significant obstacle. For example, in Bell Labs' concha-mounted Model 61, the voice tube extended from the center of the auricle, a distance almost as great as in Hutchings. Moreover, its outer end was

covered by a coil spring having spaced helical windings serving as a puff shield, and just inside its outer end the tube was filled by a disc of porous material, such as sintered stainless steel, to damp any standing wave resonance peaks. These accessories would obviously attenuate the sound waves far more than the mere two inches or so of added length which Plantronics asserts would have deterred the art from adopting an over-ear routing for the voice tube.

[40]

Of course, it does not negate patentable invention merely to establish that a desirable goal, once perceived, could have been reached by the exercise of routine skill. Patentable ingenuity may be involved in the perception of the goal. See Timely Products Corp. v. Stanley Arron, supra.

Thus we must turn to the "secondary considerations" for guidance in resolving the issue of obviousness.

The history of the art

The history of Hutchings of course begins with the history of Larkin. Virtually as soon as the MS-50 hit the market, there were suggestions from a number of sources that a similar capsule supported on the ear, like a hearing aid, would avoid the necessity of wearing an eyeglass frame or a headband. Several others actually developed such devices, using post-auricular

hearing aid capsules as a starting point, just as Hutchings did. There were only four possible combinations of voice and ear tube arrangements: both out the top, both out the bottom, the voice tube out the top and the ear tube out the bottom, and vice versa.

The choice apparently depended on the particular hearing aid used. Audiotone started with its Model 77, which had the ear tube at the top and the microphone at the bottom, so in designing the MS-43, naturally found it simpler to extend the voice tube below the ear. One starting with the

[41]

hearing aid of the German patent would presumably have done the opposite.

After its brief venture with the MS-43, which ended in 1962, Plantronics abandoned all effort to develop a post-auricular headset until the end of December 1968 when, apparently spurred by the threat of competition from Bell Labs' earmold-supported Model 61, it organized a "task force" to reactivate the project. Within a week thereafter, Hutchings had completed sketches of a new design and within another month a working prototype had been completed. This design, which was commercialized as the MS-80 "StarSet," was similar to the MS-43, except that the parts were reversed, with the microphone and voice tube at the top and receiver and ear tube at the bottom.

Bringing the ear tube out the bottom affords an obvious advantage in stability, since the stiffness of the tube and the fixation of its end plug in the ear canal resists swinging of the lower end of the capsule either outwardly away from the plane of the head or rearwardly away from the back of the ear.

However, the enhanced stability has proved of only limited significance insofar as concerns marketability. Roanwell's R-71, which has an under-ear voice tube and is accordingly not charged to infringe either of the Hutchings patents, has enjoyed and still enjoys substantial commercial

[42]

acceptance in the face of direct competition from Plantronics' StarSet and Roanwell's own R-70, both of which have over-ear voice tubes. Indeed, Roanwell's total sales of the R-70 and R-71 are roughly equal, while its sales of the R-71 to users other than Western Electric, which has standardized on the StarSet and uses Roanwell only as a second source, are roughly 6 times as great as its sales of the R-70.

One apparent reason for the continued popularity of the R-71 is that its under-ear voice tube and low-slung capsule create much less interference with eyeglasses and sunglasses.

Thus most of the "signposts" which pointed toward patentability in the case of Larkin are either missing altogether in the case of Hutchings or point in the opposite direction. The record as to Hutchings establishes no long-felt need, no fruitless search, no defiance of ancient prejudices, no instant acclaim, no driving of competitors from the market.

Plantronics urges that Roanwell's flagrant plagiarism of the StarSet is persuasive evidence of patentability. The record does disclose a driving curiosity on the part of Roanwell concerning the "second^d generation headset" which Plantronics had announced in its quarterly report to stockholders published in the spring of 1969. Immediately thereafter, Roanwell's Vice President Potter, stating that Roanwell

[43]

"must find out what it is -- soon," marshalled a number of Roanwell's personnel in a well-coordinated program of intelligence-gathering which involved interviewing Plantronics' customers and suppliers and even one of its engineers, the latter on the pretext of exploring his availability for employment, and arranging for third parties, posing as potential customers, to make inquiries to Plantronics.

These efforts met with only limited success; Roanwell apparently learned that Plantronics' "second generation

headset" employed a post-auricle capsule, but did not discover such details as the over-ear voice tube. Nevertheless, when Roanwell engaged the assistance of Unex Labs in the development of what one of its salesmen candidly termed a "me-too" version, Unex's exploratory sketches included one model having an over-ear voice tube and an under-ear ear tube. It was not until several days later, at an industry show, that the Plantronics StarSet was first publicly disclosed and Roanwell learned the full details of its construction.

When Roanwell finalized the design of its R-70, it doubtless did so conscious of its similarity to the StarSet but, even if it had not already considered the same configuration, among others, before it ever saw the StarSet, it could not be prevented from copying the design of a competitive product on the market, in the absence of a valid patent covering it, or of confusion as to the source of the goods. Sears, Roebuck & Co. v. Stiffel Co., 376 U.S. 225 (1964); Compco Corp. v. Day-Brite Lighting, Inc., 376 U.S. 234 (1964).

[44]

Plantronics further stresses the commercial success of the StarSet as evidence of non-obviousness. But commercial success, while indeed a makeweight for patentability, cannot tip the balance against such heavy evidence of obviousness. Julie Research Laboratories, Inc. v. Guildline Instruments, Inc., 501 F.2d 1131, 1135 (2d Cir. 1974); Formal

Fashions, Inc. v. Braiman Bows, Inc., 369 F.2d 536, 539 (2d Cir. 1966).

I conclude that Claim 1 of the Hutchings utility patent is invalid under 35 U.S.C. § 103.

B. FRAUD ON THE PATENT OFFICE

Roanwell urges that the Hutchings utility patent is invalid on the further ground that Hutchings and his attorney misled the Patent Office examiner 1) by arguing that Hutchings was the first to provide an over-ear voice tube, while failing to mention that in his early work Hutchings had used an Oticon post-auricular hearing aid which had a short, curved microphone tube extending from the top of the housing to the focus of the auricle and 2) by arguing that the attachment of the voice tube at the top of the housing would cause the weight of the forwardly extending tube partially to counterbalance the weight of the housing and thus enhance stability, whereas 1) the tube is too light to have any significant counter-

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balancing effect, 2) the counterbalancing effect of the tube is the same whether it is attached to top or bottom of the housing, and 3) counterbalancing actually reduces stability by producing a see-saw effect.

Hutchings' failure to mention the Oticon device was surely not for the purpose of deception. As already discussed, the examining division was intimately familiar with the hearing aid art, and doubtless was aware that many of the commercial devices then available had microphone ports at the top of the housing and even tubes extending to the focus of the auricle. But this is not the same as a voice tube cantilevered from the housing and extending some six inches to a point adjacent the wearer's mouth.

Hutchings' arguments about the counterbalancing effect of the voice tube were apparently wrong but surely the result of innocent mistake rather than a conscious effort to mislead a technically trained Patent Office examiner about a matter of elementary mechanics.

In the absence of either intent to deceive or recklessness, the patent is not invalid for fraud. Xerox Corp. v. Dennison Mfg. Co., supra.

[46]

C. DOUBLE PATENTING

Roanwell argues that the Hutchings utility patent is invalid for the further reason of double patenting, in that

the invention claimed is merely the arrangement of the various parts, which is the same subject matter covered by the Hutchings design patent also in suit.

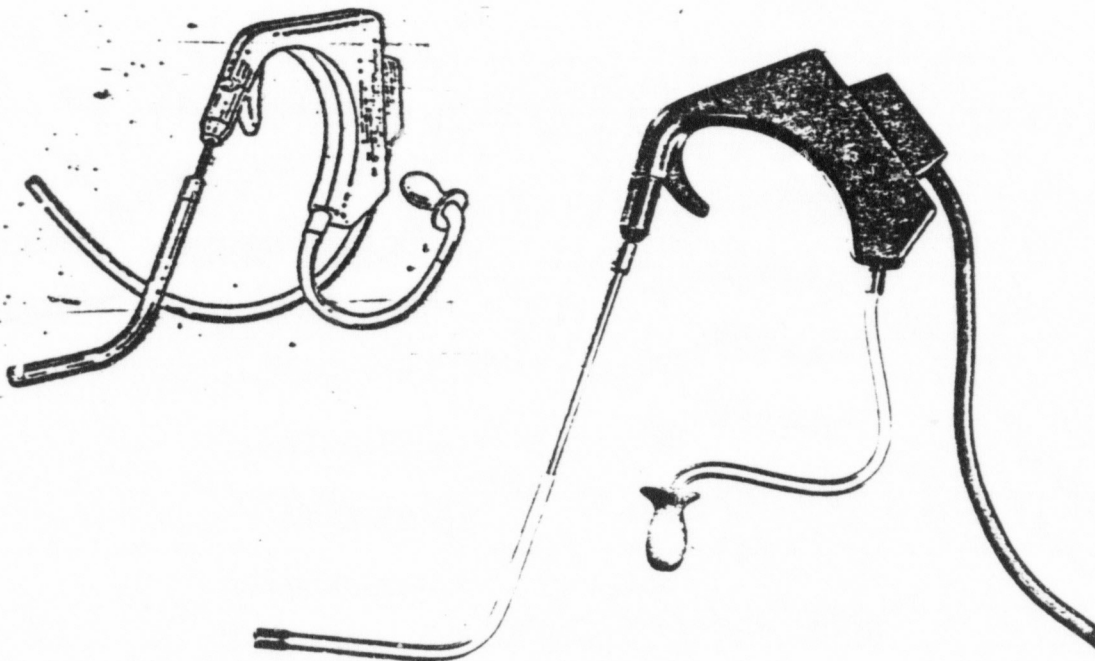
I do not agree. The two patents do not cover the same invention. It is easy to visualize many devices which would infringe the utility patent, yet would create an entirely different visual impact than the patented design; likewise, although it is not so easy, it is possible to conceive useful devices which would embody the design but which would not infringe the utility patent -- for example, using a sub-miniature microphone at the end of a boom, having approximately the same overall shape as the voice tube.

The utility patent is therefore not invalid for double patenting. Mathieu v. Mitchell Vance Co., 7 F.2d 837 (2d Cir. 1925); Bayley & Sons, Inc. v. Standart Art Glass Co., 249 F.478 (2d Cir. 1918).

[47]

III. THE HUTCHINGS DESIGN PATENT

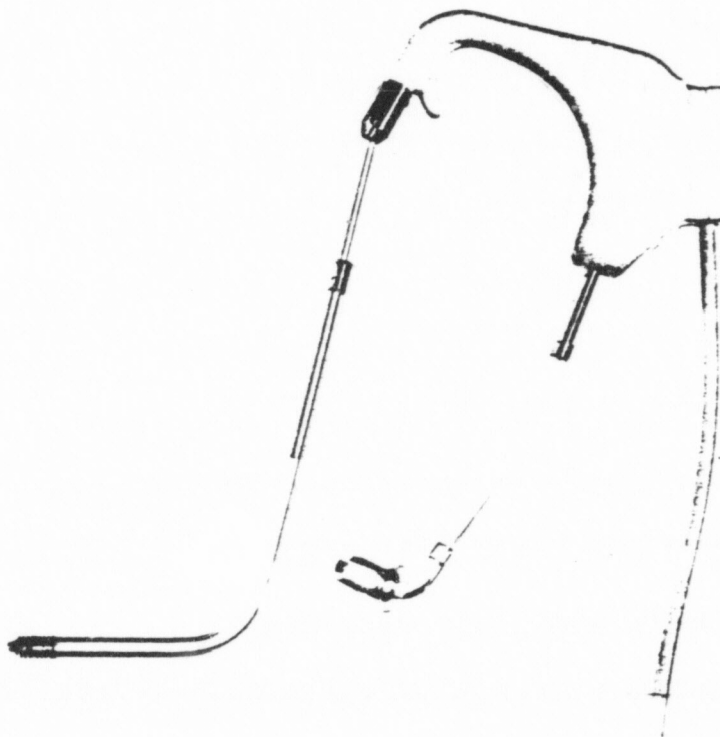
The Hutchings U.S. patent No. Des. 218,173 (the Hutchings design patent) was issued July 28, 1970 on an application filed June 16, 1969 and covers the headset design shown below in the patent drawing and in a photograph of the Plantronics MS-80 StarSet which embodied this design:



Plantronics Model 50-80
StarSet

[48]

The design patent is charged to be infringed by the
Roanwell R-70 headset:



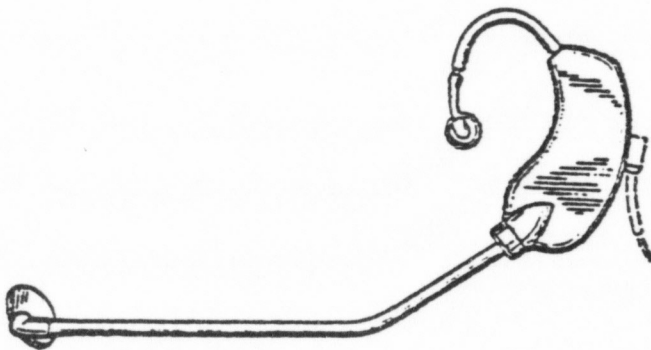
Roanwell denies infringement and asserts, as affirmative defenses, that the patent is invalid on the grounds of obviousness, non-ornamentality or functionality and fraud on the Patent Office.

A. PRELIMINARY INQUIRIES

The prior art

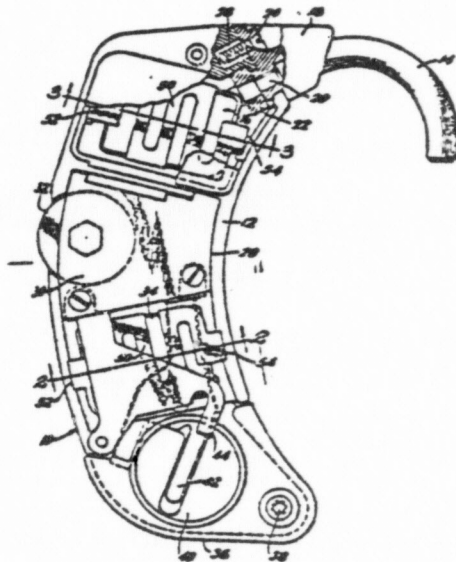
The following illustrations show the closest items of prior art relied on by Roanwell:

Flygstad U.S. patent 3,280,273 (1966):



[50]

Weiss U.S. patent 3,019,306:



The differences

Plantronics emphasizes, as novel features of the patented design, 1) the "angular" appearance resulting from the fact that all of the edges seen in elevational view, excepting only the ear-fit inner curve, are substantially

planar; 2) the narrowed hook-like prong projecting inwardly from the under side of the forward projection at the upper end of the housing; and 3) the wide metal ferrule at the outer end of this rather long, straight cylindrical projection, with the voice tube extending axially from it.

None of these three features is precisely shown in any of the prior art patents or publications in evidence.

Weiss has a flat top which adjoins the back at a relatively sharp angle; but the back is curved so as to be spaced equidistantly from the ear-contour inner surface. Flygstad has a metal ferrule around the voice tube, but it is narrow and it completely covers a short cylindrical projection.

Moreover, none of the prior art designs creates the same overall visual impression. To some viewers, their appearance may be just as pleasing. But Roanwell has chosen a design which is clearly much closer to that of the "Star Set" than to the prior art. So close, in fact, that the conclusion of deliberate copying seems inescapable.

B. INFRINGEMENT

The only significant differences between the patented design and the R-70 reside in the lengths of the several side

sections and of the cable plug. In the patented design, the back

[52]

section is slightly longer and the adjoining sections are slightly shorter. The plug is also shorter, which leaves substantial portions of the back section exposed above and below the plug. In the R-70, the longer plug completely covers the shorter back section. But these differences are minor in comparison to the many similarities. The overall visual effects of the two are strikingly similar.

Roanwell's designated deponent, Hans Mol, in comparing the patented design with that of the R-70, admitted that, "To the average layman they would look substantially the same."

This satisfies the test of design patent infringement laid down by the Supreme Court in Gorham v. White, 81 U.S. 511 (1872), namely whether "in the eye of the ordinary observer, given such attention as a purchaser usually gives, two designs are substantially the same." The same test has been applied in this Circuit. International Silver v. Pomerantz, 271 F.2d 69 (2d Cir. 1959).

I find that the R-70 infringes the Hutchings design patent.

C. FUNCTIONALITY

The prong and the ferrule are clearly functional. Indeed their only apparent raison d'etre is utility and not decoration. The prong hooks over the upper front edge of the

[53]

auricle to prevent the housing from falling off the back of the ear. Even the narrowing of the prong serves the obvious utilitarian purpose of fitting comfortably into the narrower lower portion of the space between the upper front edge of the auricle and the surface of the head. The ferrule fits over the end of the forward projection on the housing and is provided with a bayonet slot engaging a pin on the projection for removably attaching the voice tube to the housing.

Omitting these clearly functional features leaves the "angular" look as the only purely decorative feature.

I am not persuaded by Roanwell's argument that the angular look is also functional because the square microphone fits precisely into the relatively sharp right angle at the upper outside corner of the housing. When the microphone is oriented to achieve this fit, its two opposite sides are angled away from the inner surface of the housing, with a resulting wastage of interior space. The spatially most economical shape of the housing would obviously be one in

which the outside surface is "parallel" to -- i.e., equidistant from -- the inner surface and the microphone is oriented so that two of its opposing flat surfaces are aligned as closely as possible with both the inner and outer surfaces of the housing.

[54]

The angular contour of the upper corner of the housing is thus anti-functional and defiantly decorative.

D. OBVIOUSNESS

Unfortunately, in an action for infringement of a design patent there are rarely any of the "signposts" of patentability which enable an objective evaluation of the obviousness vel non of utility inventions. Since the design patent covers only optional esthetic features, there is never a long-felt need or an unsuccessful search, and it is rarely possible to allocate the specific portions of the profits on a commercial product which are respectively attributable to its utilitarian advantages and to its visual appeal. Thus, in the final analysis, a court's evaluation of the patentability of a design is essentially subjective and personal artistic tastes are unpredictable and inexplicable -- one viewer's mural is another's graffiti.

Giving a functionally curved device an "angular" look by straightening its surfaces is a device almost as old as the art of design itself. A rectangular wrist watch case is but one of a legion of examples that could readily be called to mind. But there likewise is an endless variety of different ways in which the headset housing could be given an "angular" look -- an infinite permutation of the number of planar side sections, of the ratios of their respective

[55]

lengths, and of the angles between them. The particular combination chosen by Hutchings is pleasing enough, but no more so than any of thousands of others which he might have chosen. I cannot believe that any artistic talent beyond that of a designer of ordinary skill in the art was required. The record does not reflect that Hutchings had any design training or experience whatever. Of course, this by no means disqualifies him to receive a design patent. Doubtless there are many potential Rembrandts whose hands have been fated to hold scalpels or even shovels rather than paint brushes. But it is at least some evidence that only routine skill was involved in his design of the StarSet housing.

Moreover, if there could be any patentability in the design, it would have to reside not in the broad and notoriously old concept of "angularity" but in the particular number of planar side sections and of the ratios

of their respective lengths. As already noted, while the Roanwell R-70 housing has the same number of side sections, it has a shorter back section and longer adjoining sections than the Hutchings design, and the plug covers the entire back section. If the Hutchings patent were given a sufficiently narrow interpretation to preserve its validity, it would not be infringed by the R-70.

[56]

I conclude that the Hutchings design patent is invalid for obviousness under § 103.

E. FRAUD ON THE PATENT OFFICE

Roanwell contends that, after the Patent Office examiner failed to cite against the application for the design patent any prior art showing post-auricle headsets, Hutchings and his attorney should have called to his attention the Flygstad patent of which they were well aware and which they had called to the attention of the examiner handling the application for the Hutchings utility patent.

I do not find that this failure amounted to fraud. The Hutchings design application did not cover post-auricle headsets per se, but only the specific design shown. Flygstad's headset embodied an entirely different design with a long curved back surface merging smoothly with a more

abruptly curved bottom surface. It lacks the angular appearance which characterizes the patented design. Its citation to the Patent Office would not likely have affected the prosecution of the Hutchings application, and its withholding was apparently without any deceptive intent.

[57]

IV. ATTORNEY'S FEES

Both parties have sought an award of their attorney's fees. However, I find nothing which renders this case "exceptional" within the contemplation of 35 U.S.C. § 285. None of the plaintiff's claims and none of the defenses was sham or frivolous; all were clearly asserted in good faith and with obvious conviction; the trial was conducted expeditiously and with great skill on both sides; and, typically of the patent trial bar, counsel were not only courteous, but admirably cooperative in discovery and in entering into stipulations of fact which materially shortened the trial. No attorney's fees are awarded.

V. SUMMARY

Claim 1 of the Larkin patent is valid and infringed by the Roanwell R-70 and R-71 headsets. Claim 1 of the Hutchings utility patent is invalid. The Hutchings design

patent is invalid but, if valid, would be infringed by the Roanwell R-70 headset.

Plantronics is entitled to an injunction restraining further infringement of Claim 1 of Larkin for the remainder of the term thereof and, if the parties cannot compromise the matter, to an accounting of damages for past infringement.³

Plantronics' counsel should prepare a proposed judgment order

[58]

and submit it to Roanwell's counsel for approval as to form.

/s/ William C. Conner
United States District Judge

Dated: New York, New York

August 28, 1975

[a]

FOOTNOTES

1. Claim 1 of the Larkin patent reads:

"1. A miniaturized microphone headset employing a miniature microphone and a miniature receiver, comprising the combination of support means for detachably supporting the miniature microphone and the miniature receiver adjacent to the wearer's ear, a first acoustical tube, means for attaching one end of said first tube to said microphone and the other end of said first tube being adapted to be positioned adjacent to the wearer's mouth, a second acoustical tube, and means for attaching one end of said second tube to said receiver and the other end of said second tube being adapted to be plugged into the wearer's ear."

2. Claim 1 of the Hutchings utility patent reads:

"1. A headset comprising a housing adapted to be placed behind the ear of a user, said housing including an integral upper curved extension adapted to extend over and engage the top of the ear, a microphone disposed in and near the top of said housing, a forwardly extending voice tube communicating with said microphone and positionably secured to the upper extension of said housing, said voice tube being adapted to have its distal end positioned adjacent the user's mouth, a receiver disposed in and near the bottom of said housing, and a flexible tube secured to the bottom of the housing and adapted to provide communication to the auditory canal of the user's ear."

[b]

3. In connection with Plantronics' claim for treble damages, I find that Roanwell's infringement of the Larkin patent was not deliberate and willful because Roanwell relied upon the advice of able outside counsel that all of the claims of the patent which did not recite the mask were invalid. Following the trial, Plantronics moved to strike the portion of Roanwell's answer which alleges that it acted upon the advice of counsel, on the ground that Roanwell did not offer at the trial any evidence to support that allegation but instead asserted an attorney-client privilege with respect to all communications between it and its attorneys. I find, to the contrary, that Roanwell did introduce, as defendants' Exhibit KK, a letter dated August 19, 1965 from its patent counsel advising that the Larkin patent is invalid in view of the prior Pritchett and Dreher patents.

PLANTRONICS, INC.

v.

Defendant.

JUDGMENT

ORDERED, ADJUDGED, AND DECREED as follows:

- 1127

3. Defendant Roanwell Corporation has infringed claim 1 of said Letters Patent No. 3,184,556, by making and selling to wit:

- a) The device of Plaintiff's Exhibit 4, known as Roanwell model R-70 headset.
- b) The device of Plaintiff's Exhibit 5, known as Roanwell model R-71 headset.

4. Plaintiff Plantronics, Inc., is entitled to recover of defendant the damages which it has sustained by reason of the said defendant's manufacture or sale of the said infringing headsets or their substantial equivalents, on and after May 18, 1965.

5. Defendant Roanwell Corporation, its officers, agents, servants, and employees, and those persons in active concert or participation with it who receive notice hereof, are hereby restrained and enjoined from and after the date hereof and until May 18, 1982, from directly or indirectly infringing claim 1 of said Letters Patent No. 3,184,556, by making, using or selling or causing to be made, used, or sold, headsets of the type or style herein identified as infringing, or any infringing equivalents thereof.

* * * * *

6. United States Letters Patent No. 3,548,118, and each claim thereof, are invalid.

7. The complaint is dismissed with respect to the said Letters Patent No. 3,548,118.

* * * * *



8. United States Letters Patent Des. 218,173 are invalid.

9. The complaint is dismissed with respect to the said Letters Patent Des. 218,173.

* * * * *

10. On defendant's counterclaim, declaratory judgment is granted that United States Letters Patent 3,548,118 and Des. 218,173 are invalid.

11. The counterclaim is dismissed in all other respects.

* * * * *

12. No judgment for costs or attorneys' fees is entered for either party.

13. The determination of the amount to be awarded as damages to Plaintiff is reserved for later disposition.

14. This judgment is final except for the accounting.

Date: Sept. 25, 1975.

/s/ William E. Conner
United States District Judge

Approved as to form:

Approved as to form:

/s/ Paul M. Janicke
Attorney for Plaintiff
ARNOLD, WHITE & DURKEE
2100 Transco Tower
Houston, Texas 77027

/s/ Lester W. Clark
Attorney for Defendant
COOPER, DUNHAM, CLARK, GRIFFIN
& MORAN
30 Rockefeller Plaza
New York, New York 10020

/s/ Robert Neuner
Attorney for Plaintiff
Robert Neuner
Brumbaugh, Graves, Donahue & Raymond
30 Rockefeller Plaza
New York, New York 10020